建筑：形式、空间和秩序

［第二版］

ARCHITECTURE: FORM, SPACE, &ORDER

[Second Edition]

程大锦(Francis D. K. Ching)/著
刘从红/译　邹德侬/审校



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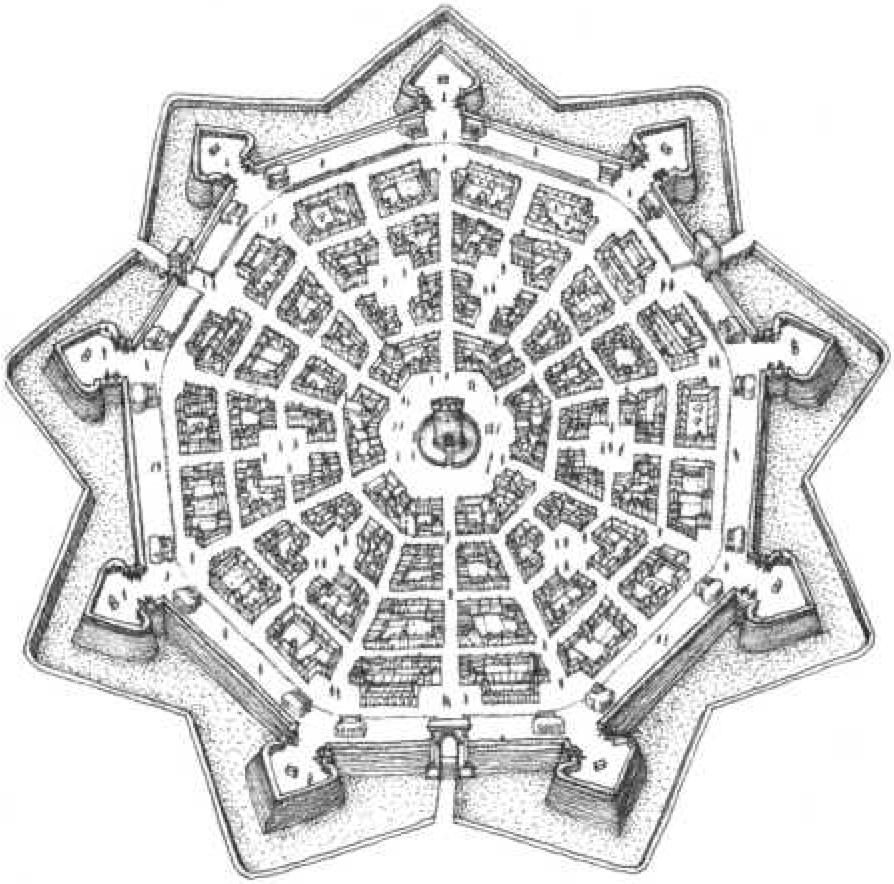
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The original edition of this study introduced the student of architecture to form and space and the principles that guide their ordering in the built environment. Form and space are the critical means of architecture that comprise a design vocabulary that is both elemental and timeless. While this revision continues to be a comprehensive primer on the ways form and space are interrelated and organized in the shaping of our environment, it has been refined by editing the text and incorporating diagrams for greater clarity, adding selected examples of architectural works, expanding the sections on openings, stairways and scale, and finally, by including a glossary and an index to designers.

This work continues to illustrate the ways the fundamental elements and principals of architectural design manifest themselves over the course of human history. These historical models span time and cross cultural boundaries. While the juxtaposition of styles may appear to be abrupt at times, the diverse range of examples is deliberate. The collage is intended to persuade the reader to look for likenesses among seemingly unlike constructions and bring into sharper focus the critical distinctions that reflect the time and place of their making. Readers are encouraged to take note of additional examples encountered or recalled within the context of their individual experiences. As the design elements and principles become more familiar, new connections, relationships, and levels of meaning may be established.

The illustrated examples are neither exhaustive nor necessarily the prototypes for the concepts and principles discussed. Their selection merely serves to illuminate and clarify the formal and spatial ideas being explored. These seminal ideas transcend their historical context and encourage speculation: How might they be analyzed, perceived, and experienced? How might they be transformed into coherent, useful, and meaningful structures of space and enclosure? How might they be reapplied to a range of architectural problems? This manner of presentation attempts to promote a more evocative understanding of the architecture one experiences, the architecture one encounters in literature, and the architecture one imagines while designing.

这项研究的最初版本向建筑学专业的学生们介绍了形式和空间以及把它们用于建筑环境中的原则。形式和空间是重要的建筑手段，包含着基本的和永恒的设计语言。这本修订版仍然是一部全面的入门书籍，分析了在塑造环境的时候如何把形式和空间联系起来，如何组织形式和空间。此次修订，为了达到更加清楚明确的目的，我们重新编辑了文字，整理了图表，增加了精选的建筑实例，在洞口、楼梯、尺度等章节增添了新的内容，最后为设计人员总结出词汇表和索引。

这本书继续阐明了在人类历史进程中建筑设计的基本要素和原则是如何表达的。这些历史模式跨越了时间和文化的界限。虽然有些时候，某些风格的并置看来可能是唐突的，但书中各种各样的实例都是精心挑选的。把各种因素集结在一起，是为了让读者在看似不同的建筑中寻找相似点，并把目光聚焦于那些最为本质的不同点，因为这些不同点反映了建造的年代和建造的场所。我们鼓励读者去关注那些在个人经历中碰到或想到的其他实例。随着设计要素和设计原则变得越来越熟知，就会建立新的连接方式、新的关系和新的意义。

当然，书中引用的建筑实例并不是尽善尽美的，也不一定都是我们讨论的概念和原则所需要的原型。选择这些例子仅仅是为了说明和澄清我们所研究的形式概念和空间概念。这些基本概念超越了历史背景，鼓励人们去思索：如何分析、发现和体验这些原则？如何把这些原则转译成连贯的、实用的、含义丰富的空间结构和围护结构？如何把这些原则重新用于一系列的建筑问题？这种介绍方式可以帮助读者更好地理解人们所体验的建筑、在文献里碰到的建筑以及人们在设计过程中想象的建筑。

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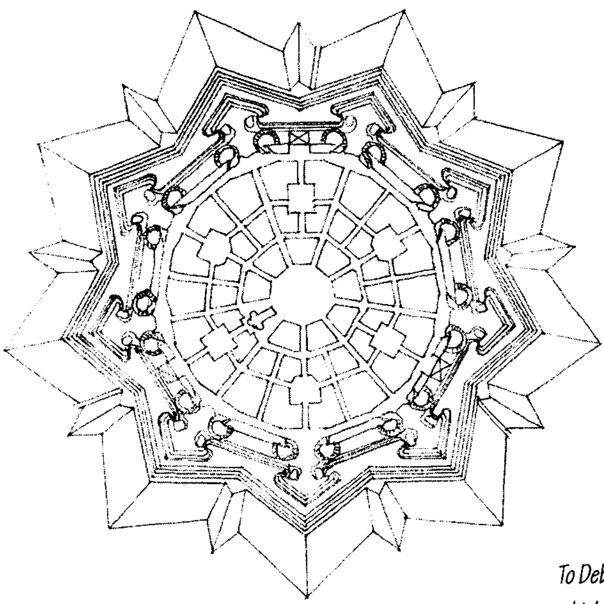
致谢

I am indebted to the following people for their valuable contributions to the original edition of this work: Forrest Wilson, whose insights into the communication of design principles helped clarify the organization of the material, and whose support made its publication possible; James Tice, whose knowledge and understanding of architectural history and theory strengthened the development of this study; Norman Crowe, whose diligence and skill in the teaching of architecture encouraged me to pursue this work; Roger Sherwood, whose research into the organizational principles of form fostered the development of the chapter on ordering principles; Daniel Friedman, for his enthusiasm and careful editing of the final copy; Diane Turner and Philip Hamp, for their assistance in researching material for the illustrations; and to the editorial and production staff at Van Nostrand Reinhold, for their exceptional support and service during the making of this book.

我要感谢下列人士，他们为本书第一版的问世做出了宝贵贡献。F. 威尔逊谙熟设计原理的资料，他帮助我把材料组织得一清二楚，由于他的协助，使本书的出版成为可能；J.太斯通晓建筑历史和理论，大大推进了研究的发展；N.柯罗在建筑教学方面的才能鼓舞我从事这项研究；R.舍伍德在形式的组合原理方面的研究，有助于秩序原理这一章的深入论述；D.弗莱德曼为人热情，为本书的最后一稿进行了精心整理；D. 特纳和P. 汉普协助搜集了插图资料；冯·诺斯泉德·莱因霍尔德公司的编辑和出版人员，在本书的制作过程中给予了特别的支持和热情的服务。

For this second edition, I want to express my appreciation to the many students and their teachers who have used this book over the years and offered suggestions for its improvement as a reference and tool for study and teaching. I want to especially thank the following educators for their careful and thoughtful critique of the first edition: L. Rudolph Barton, Laurence A. Clement, Jr., Kevin Forseth, Simon Herbert, Jan Jennings, Marjorie Kriebel, Thomas E. Steinfeld, Cheryl Wagner, James M. Wehler, and Robert L. Wright. While I have attempted to incorporate much of their wise counsel for enhancing this second edition, I remain solely responsible for any of its deficiencies.

对于本书的第二版，我要向很多师生表示感谢。多年来，作为教学参考书和工具书，他们一直使用这本书并为它的修订提出建议。我特别要感谢以下几位教育家，他们对本书的第一版提出了深入细致的批评。这些教育家是L. R. 巴顿、L. A. 克莱门特、K. 弗塞斯、S. 赫伯特、J. 詹宁斯、M. 柯瑞尔伯、T. E. 斯特恩弗德、C. 瓦戈纳、J. M. 韦禾勒以及R. L. 莱特。为了提高第二版的质量，我尽量把他们明智的建议反映在书中。尽管如此，我仍然对该书的不当之处负有全部责任。



To Debra, Emily, and Andrew, for their love of life, which ultimately it is the role of architecture to house.

献给黛布拉、艾米丽和安德鲁，为了他们在生活中付出的关爱，这才是建筑所要承载的最终责任。

Architecture is generally conceived—designed—and realized—built—in response to an existing set of conditions. These conditions may be purely functional in nature, or they may also reflect in varying degrees the social, political, and economic climate. In any case, it is assumed that the existing set of conditions—the problem—is less than satisfactory and that a new set of conditions—a solution—would be desirable. The act of creating architecture, then, is a problem-solving or design process.

The initial phase of any design process is the recognition of a problematic condition and the decision to find a solution to it. Design is above all a willful act, a purposeful endeavor. A designer must first document the existing conditions of a problem, define its context, and collect relevant data to be assimilated and analyzed. This is the critical phase of the design process since the nature of a solution is inexorably related to how a problem is perceived, defined, and articulated. Piet Hein, the noted Danish poet and scientist, puts it this way: "Art is solving problems that cannot be formulated before they have been solved. The shaping of the question is part of the answer."

Designers inevitably and instinctively prefigure solutions to the problems they are confronted with, but the depth and range of their design vocabulary influence both their perception of a question and the shaping of its answer. If one's understanding of a design language is limited, then the range of possible solutions to a problem will also be limited. This book focuses, therefore, on broadening and enriching a vocabulary of design through the study of its essential elements and principles and the exploration of a wide array of solutions to architectural problems developed over the course of human history.

As an art, architecture is more than satisfying the purely functional requirements of a building program. Fundamentally, the physical manifestations of architecture accommodate human activity. However, the arrangement and ordering of forms and spaces also determine how architecture might promote endeavors, elicit responses, and communicate meaning. So while this study focuses on formal and spatial ideas, it is not intended to diminish the importance of the social, political, or economic aspects of architecture. Form and space are presented not as ends in themselves but as means to solve a problem in response to conditions of function, purpose, and context—that is, architecturally.

The analogy may be made that one must know and understand the alphabet before words can be formed and a vocabulary developed; one must understand the rules of grammar and syntax before sentences can be constructed; one must understand the principles of composition before essays, novels, and the like can be written. Once these elements are understood, one can write poignantly or with force, call for peace or incite to riot, comment on trivia or speak with insight and meaning. In a similar way, it might be appropriate to be able to recognize the basic elements of form and space and understand how they can be manipulated and organized in the development of a design concept, before addressing the more vital issue of meaning in architecture.

建筑通常是根据一系列已知条件进行设想（设计）和实施（建造）的。从本质上讲，这些条件可以是纯功能性的，或者说它们也许在不同程度上反映了社会的、政治的和经济的氛围。无论如何，已有的一系列条件（问题）远不能令人满意，于是就需要一系列完美的新条件（答案）。这样一来，建筑的创作活动就是一个从提问题到找答案的过程，或者叫做“设计过程”。

任何设计过程的第一阶段，都是去认识问题的所在，并决心给它找出一个答案来。因此，设计首先是一种意识很强的活动，是一种有目的性的努力。设计师首先必须把问题的现有条件详加整理，弄清它的来龙去脉，收集有关资料并加以消化。这是设计过程中的一个极其重要的阶段，因为发现问题、理解问题和表达问题的方式，与答案的实质有着不可分割的关系。著名的丹麦诗人兼科学家P. 海恩这样说过：“艺术在于解决问题，当人们在解决问题以前是不可能有什么模式的。问题的形成就是答案的一部分。”

面临问题，设计师出于本能，不可避免地要预测答案。然而他们所掌握的设计语汇的深度和广度，不仅会影响到对问题的认识，而且也影响到答案的形成。如果某人对于设计语言的理解是非常有限的，那么面对一个问题，其答案的广度也是有限的。因此，本书通过研究建筑的基本要素和基本原则，通过阐述人类历史进程中形成的、许许多多对于建筑问题的答案，来拓展和丰富建筑语汇。

作为一门艺术，建筑不能仅仅满足设计任务书中纯功能上的要求。从根本上说，建筑在物质上的表现是顺应人类活动的。然而，空间和形式要素的安排和组合，则决定建筑物如何激发人们的积极性，引起反响，以及表达某种含义。所以，这项研究虽然集中于形式和空间的构思，但是并不打算贬低建筑在社会、政治、经济等方面的重要性。介绍这些形式和空间的要素本身并不是目的，而是在于把它们当成解决问题的手段，以符合功能上、意图上以及与周围关系上所提出的条件，这是从建筑的角度上看问题的。

可以打一个比喻，在构成单字和扩展词汇之前，人们必须先学字母；在造句之前，人们必须学会句法和语法；在写文章、小说之类的东西之前，必须懂得作文方法。一旦掌握了这些基本要素，人们便可以尖锐泼辣或气势磅礴地书写文章，可以呼吁和平，亦可煽动暴力；可以评议生活琐事，亦可发表持之有故、言之成理的演说。同样，在表达更为重要的建筑意义之前，必须首先认识形式与空间的基本要素，理解在某一设计构思的发展过程中，如何运用和组织这些要素。

In order to place this study in proper context, the following is an overview of the basic elements, systems, and orders that constitute a work of architecture. All of these constituents can be perceived and experienced. Some may be readily apparent while others are more obscure to our intellect and senses. Some may dominate while others play a secondary role in a building's organization. Some may convey images and meaning while others serve as qualifiers or modifiers of these messages.

为了把这项研究置于恰当的背景中，下面是构成一个建筑作品的基本要素、体系和秩序的概观。这些构成部分都是可以感知和体验的。对于人们的感觉来说，有些也许一目了然，有些可能含糊不清；有些在建筑组合中统领全局，有些则扮演次要角色；有些带有形象和含义，有些则修饰和限定这些形象和含义。

In all cases, however, these elements and systems should be interrelated to form an integrated whole having a unifying or coherent structure. Architectural order is created when the organization of parts makes visible their relationships to each other and the structure as a whole. When these relationships are perceived as mutually reinforcing and contributing to the singular nature of the whole, then a conceptual order exists—an order that may well be more enduring than transient perceptual visions.

但是无论如何，这些要素和体系应该相互联系，形成一个综合的整体，具有统一的或连贯的结构。当这些要素和体系，作为整体的各个局部业已形成明显的相互关系时，建筑秩序才得以产生。当这些关系被人感知，彼此加强，并完全从属于整体的基本特性时，那么一个概念上的秩序也就应运而生了——这种秩序可能更持久，而绝非转瞬即逝的感性观察所能比拟。

Architectural Systems
建筑体系

The **Architecture** of
建筑

Space 空间
Structure 结构
Enclosure 围护物

- organizational pattern, relationships, hierarchy
- formal image and spatial definition
- qualities of shape, color, texture, scale, proportion
- qualities of surfaces, edges, and openings
- 组织模式、关系和层次
- 形式表象和空间限定
- 形状、色彩、质感、比例、尺度的特性
- 表面、边缘和洞口的特性

Experienced through
体验经由

Movement in Space-Time 空间—时间中的运动

- approach and entry
- path configuration and access
- sequence of spaces
- light, view, touch, hearing, and smell
- 引道和入口
- 通道的形状和进入
- 空间序列
- 光线、视野、触觉、听觉和嗅觉

Achieved by means of
取得的手段

Technology
技术

- structure and enclosure
- environmental protection and comfort
- health, safety, and welfare
- durability
- 结构和围护物
- 环境的保护和舒适
- 健康、安全和福利
- 耐久性

Accommodating a
提供一个

Program
设计纲要

- user requirements, needs, aspirations
- sociocultural factors
- economic factors
- legal restraints
- historical tradition and precedents
- 使用者的要求、需要和愿望
- 社会文化因素
- 经济因素
- 法律上的制约
- 历史传统和先例

Compatible with its
适应于

Context
周围关系

- site and environment
- climate: sun, wind, temperature, precipitation
- geography: soils, topography, vegetation, water
- sensory and cultural characteristics of the place
- 基地和环境
- 气候：日照、风向、温度、降水量
- 地理：土壤、地形、植被、水文
- 场所的直觉特性和文化特点

...& Orders
……建筑秩序

Physical
物质上的

Form and Space 形式和空间
- solids and voids · 实与虚
- interior and exterior · 室内与室外

Systems and organizations of 体系和组合
- space · 空间
- structure · 结构
- enclosure · 围护物
- machines · 机械

Perceptual Sensory perception and recognition of the physical elements by experiencing them sequentially in time

知觉上的 感官的知觉和时常连续体验到的对物质因素的认识

- approach and departure
- entry and egress
- movement through the order of spaces
- functioning of and activities within spaces
- qualities of light, color, texture, view, and sound

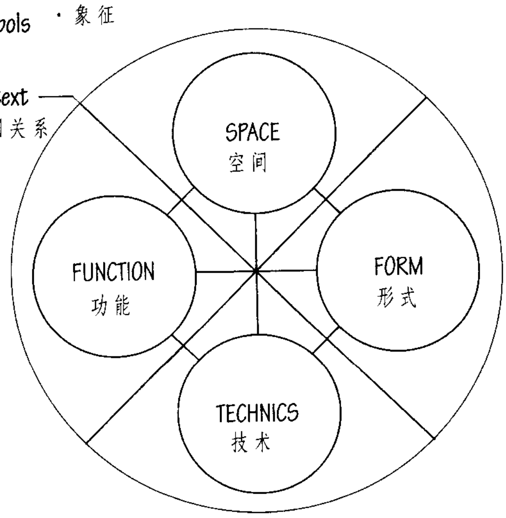
- 接近和离开
- 入口和出口
- 通过空间序列的运动
- 空间中的功能和活动
- 光线、色彩、质感、景观和声音的特性

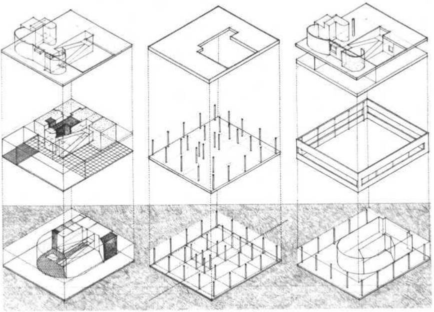
Conceptual Comprehension of the ordered or disordered relationships among a building's elements and systems, and responding to the meanings they evoke

观念上的 在建筑物的要素和体系中，对有秩序或无秩序关系的理解，以及对它们所引起的含义的反应

- images · 形象
- patterns · 图案
- signs · 符号
- symbols · 象征

- context
- 周围关系





Spatial System

- The three-dimensional integration of program elements and spaces accommodates the multiple functions and relationships of a house.

空间体系

- 由设计纲要的要素和空间构成的三度整体，满足了多样化的功能和一所住宅各要素之间的关系。

Structural system

- A grid of columns supports horizontal beams and slabs.
- The cantilever acknowledges the direction of approach along the longitudinal axis.

结构体系

- 一个柱网支持水平梁、板。
- 悬挑部分标识出通道的方向沿着纵轴。

Enclosure system

- Four exterior wall planes define a rectangular volume that contains the program elements and spaces.

围护体系

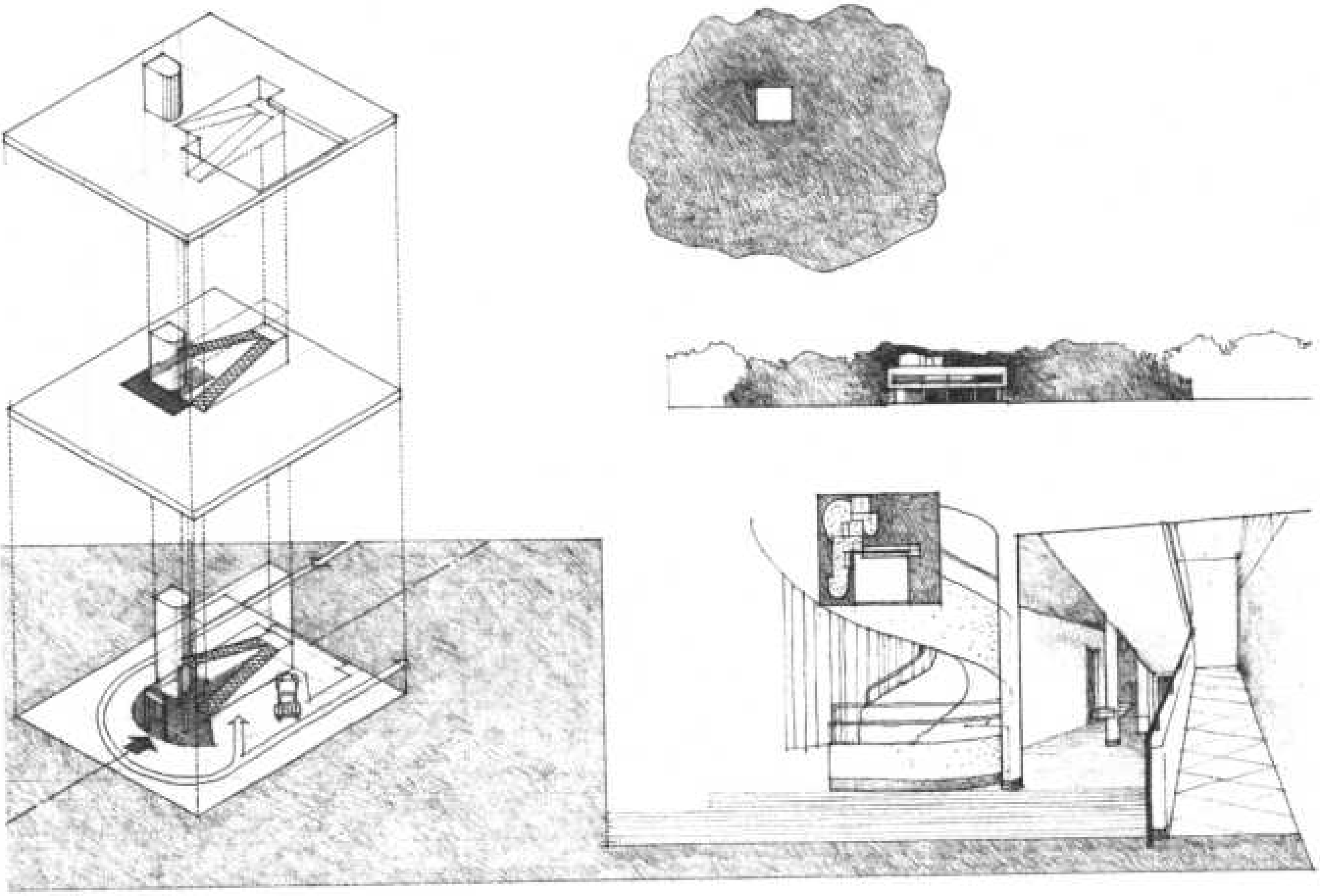
- 有四面外墙的墙面，限定了一个矩形的体量，其中包含着设计纲要的要素和空间。

Villa Savoye, Poissy, east of Paris, 1928–1931, Le Corbusier

萨伏伊别墅，普瓦西，巴黎东郊，1928年—1931年，勒·柯布西埃

This graphic analysis illustrates the way architecture embodies the harmonious integration of interacting and interrelated parts into a complex and unified whole.

这个图示分析是建筑方式的具体表达，把建筑中相互作用、相互关联的部分和谐地构成一个复杂和统一的整体。



Circulation system

- The stair and ramp penetrate and link the three levels, and heighten the viewer's perception of forms in space and light.
- The curved form of the entrance foyer reflects the movement of the automobile.

交通体系

- 楼梯和坡道穿越和联结三个楼层，并且增加了观者对空间中的形体和光线的感受。
- 入口门厅的曲线形式反映了汽车的运动轨迹。

Context

- A simple exterior form wraps around a complex interior organization of forms and spaces.
- Elevating the main floor provides a better view and avoids the humidity of the ground.
- A garden terrace distributes sunlight to the spaces gathered around it.

周围关系

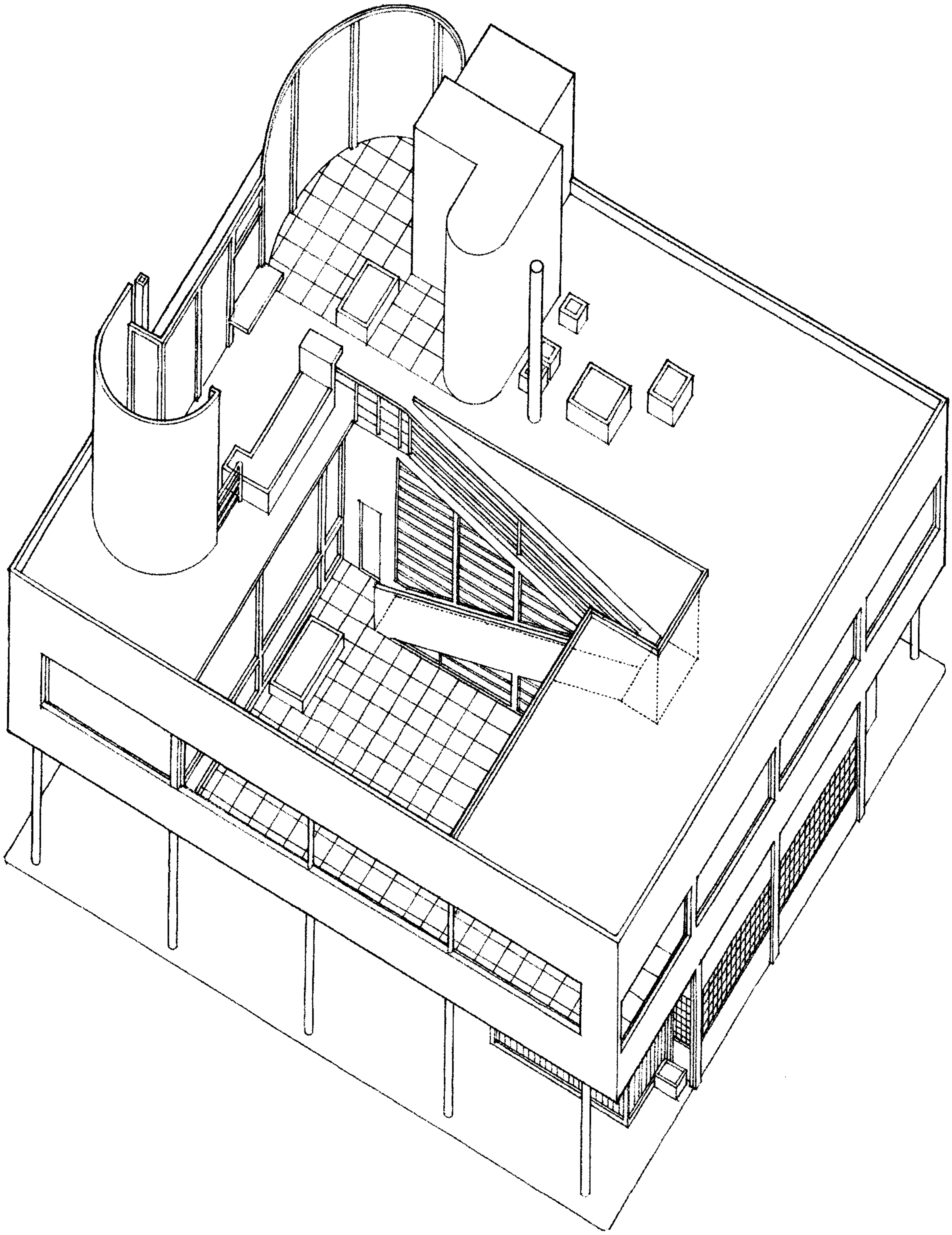
- 一个简洁的外形包裹着内部复杂的形体与空间组织。
- 主要平面升高，提供了良好的视线并且避免了地面的潮湿。
- 一个花园平台为其周围的空间提供阳光。

"Its severe, almost square exterior surrounds an intricate interior configuration glimpsed through openings and from protrusions above. . . . Its inside order accommodates the multiple functions of a house, domestic scale, and partial mystery inherent in a sense of privacy. Its outside order expresses the unity of the idea of house at an easy scale appropriate to the green field it dominated and possibly to the city it will one day be part of."

Robert Venturi, *Complexity and Contradiction in Architecture*, 1966

"其朴素的，几乎是方形的外部，围绕着复杂的内部组合，通过建筑上的洞口和顶部的凸起，内部的复杂性隐约可见……其内部秩序符合一所住宅的多样性功能，家庭的尺度以及在某种意义上私密性所固有的神秘感。其外部秩序，以平和易懂的尺度表达了住宅构思的整体性，与其所处的绿地非常和谐，并且有朝一日该建筑也许仍会与所在的城市和谐相处。"

R. 文丘里，《建筑的复杂性与矛盾性》，1966年



1 基本要素
Primary Elements

"All pictorial form begins with the point that sets itself in motion . . .
The point moves . . . and the line comes into being—the first dimension.
If the line shifts to form a plane, we obtain a two-dimensional element.
In the movement from plane to spaces, the clash of planes gives rise to
body (three-dimensional) . . . A summary of the kinetic energies
which move the point into a line, the line into a plane,
and the plane into a spatial dimension."

Paul Klee
The Thinking Eye: The Notebooks of Paul Klee
(English translation)
1961

"所有的绘画形式，都是由处于运动状态的点开始的……点的运动形成了线，得到第一个量度。如果线移动，则形成面，我们便得到了一个两度的要素。在从面向空间的运动中，面面相叠形成体（三度的）……总之，是运动的活力，把点变成线，把线变成面，把面变成了空间的量度。"

保罗·克利
《思考的眼睛：保罗·克利笔记》
1961年

This opening chapter presents the primary elements of form in the order of their growth from the point to a one-dimensional line, from the line to a two-dimensional plane, and from the plane to a three-dimensional volume. Each element is first considered as a conceptual element, then as a visual element in the vocabulary of architectural design.

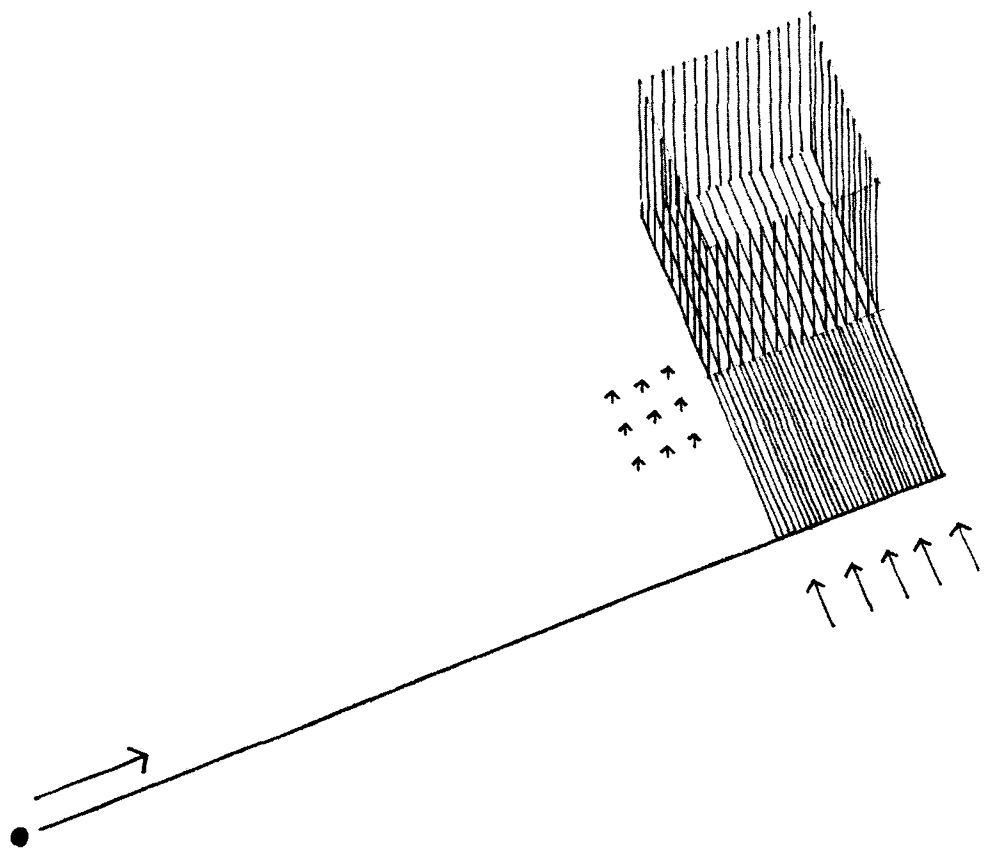
开篇第一章，以基本要素发展的顺序，介绍这些形式的基本要素：从点到一度的线，从线到两度的面，从面到三度的体。每个要素首先都被认为是一个概念性的要素，然后才是建筑设计语汇中的视觉要素。

As conceptual elements, the point, line, plane, and volume are not visible except to the mind's eye. While they do not actually exist, we nevertheless feel their presence. We can sense a point at the meeting of two lines, a line marking the contour of a plane, a plane enclosing a volume, and the volume of an object that occupies space.

作为概念性的要素，点、线、面和体是看不到的，只有在头脑中可以感知到。虽然，这些要素实际上并不存在，但是我们能够感觉到它们的存在。在两条线的相交处，我们可以感知点的存在，一条线可以标识出平面的轮廓，平面可以围成一个体，并且这个体量构成了占据空间的实体。

When made visible to the eye on paper or in three-dimensional space, these elements become form with characteristics of substance, shape, size, color, and texture. As we experience these forms in our environment, we should be able to perceive in their structure the existence of the primary elements of point, line, plane, and volume.

当这些要素在纸面上或在三度空间中变成可见元素时，它们就演变成具有内容、形状、规模、色彩和质感等特性的形式。当在环境中体验这些形式的时候，我们应该能够识别存在于其结构中的基本要素——点、线、面和体。



As the prime generator of form, the
作为形式的基本生成要素，

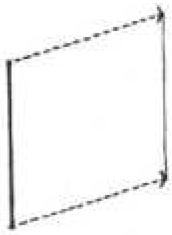
Point indicates a position in space.
点 表示在空间中的一个位置。

A point extended becomes a
Line with properties of:
- length
- direction
- position



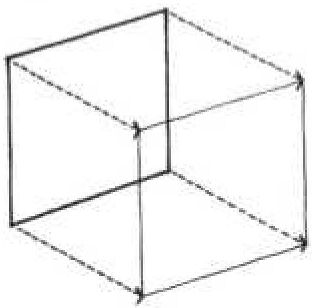
一个点延伸变成一条
线 其特征如下：
- 长度
- 方向
- 位置

A line extended becomes a
Plane with properties of:
- length and width
- shape
- surface
- orientation
- position

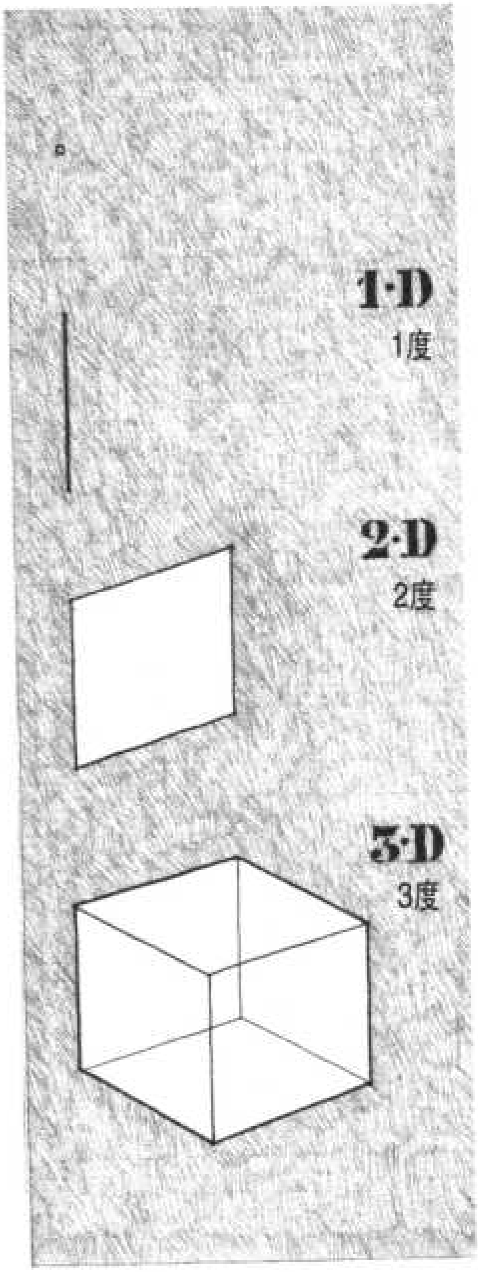


一条线展开变成一个
面 其特征如下：
- 长度和宽度
- 形状
- 表面
- 方位
- 位置

A plane extended becomes a
Volume with properties of:
- length, width, and depth
- form and space
- surface
- orientation
- position



一个面展开变成一个
体 其特征如下：
- 长度、宽度和深度
- 形式和空间
- 表面
- 方位
- 位置

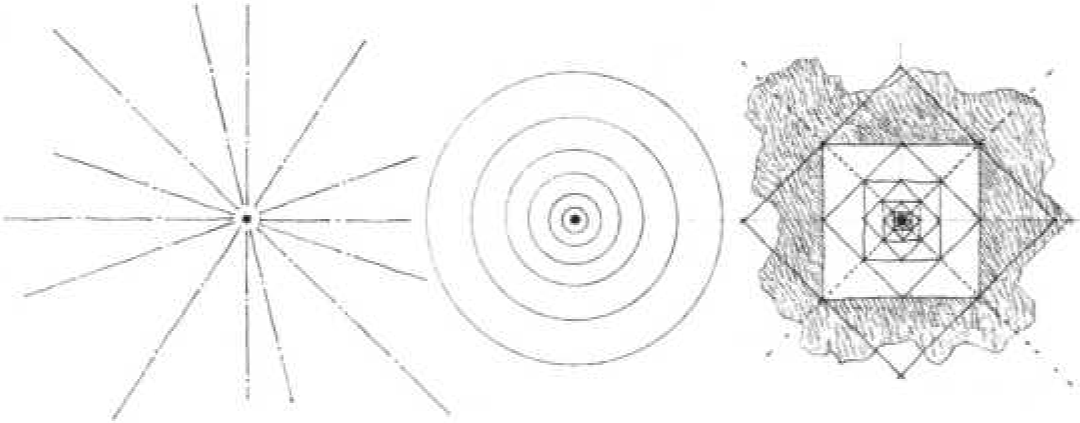


Point
点

Line
线

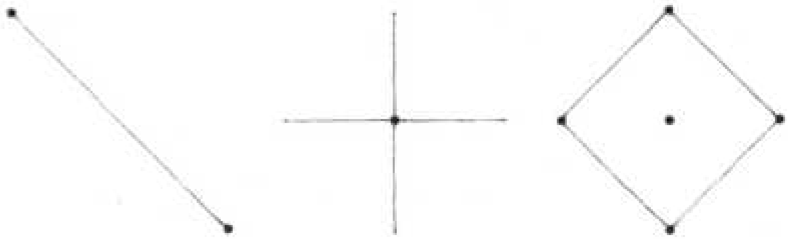
Plane
面

Volume
体



A point marks a position in space. Conceptually, it has no length, width, or depth, and is therefore static, centralized, and directionless.

一个点标出了空间中的一个位置。从概念上讲，它没有长、宽或深，因而它是静态的、集中性的，而且是无方向的。

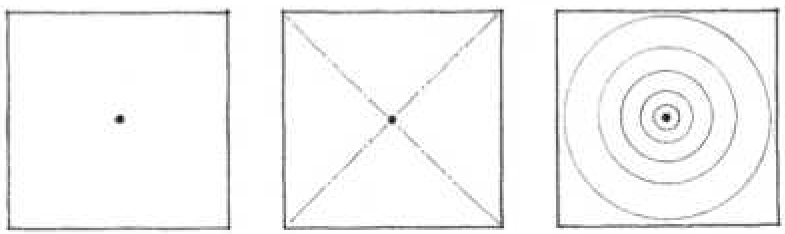


As the prime element in the vocabulary of form, a point can serve to mark:

- the two ends of a line
- the intersection of two lines
- the meeting of lines at the corner of a plane or volume
- the center of a field

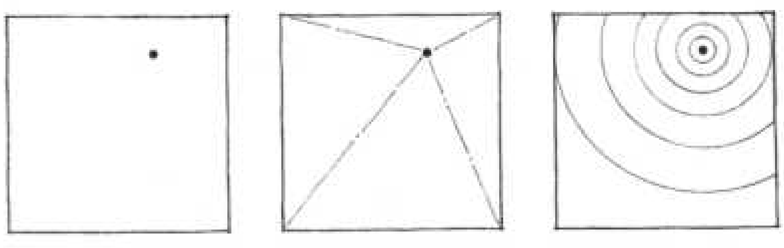
作为形式语汇中的基本要素，点可以标识以下内容：

- 一条线的两端
- 两条线的交点
- 面或体角部线条的相交处
- 一个范围的中心



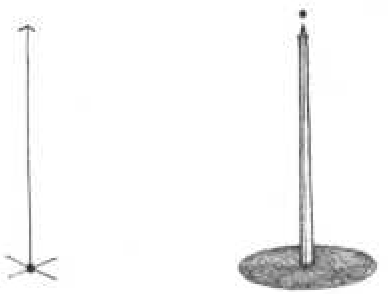
Although a point theoretically has neither shape nor form, it begins to make its presence felt when placed within a visual field. At the center of its environment, a point is stable and at rest, organizing surrounding elements about itself and dominating its field.

尽管从理论上讲一个点没有形状或体形，当把它放在视野中时，便形成它的存在感。当它处于环境中心时，一个点是稳定的、静止的，以其自身来组织围绕它的诸要素，并且控制着它所处的范围。



When the point is moved off-center, however, its field becomes more aggressive and begins to compete for visual supremacy. Visual tension is created between the point and its field.

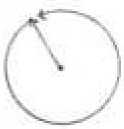
但是，当这个点从中心偏移的时候，它所处的这个范围就会变得比较有动势，并开始争夺在视觉上的控制地位。点和它所处的范围之间，造成了一种视觉上的紧张关系。

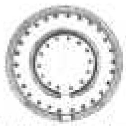


A point has no dimension. To visibly mark a position in space or on the ground plane, a point must be projected vertically into a linear form, as a column, obelisk, or tower. Any such columnar element is seen in plan as a point and therefore retains the visual characteristics of a point. Other point-generated forms that share these same visual attributes are the:

一个点没有量度。点在空间里或在地平面上如果要明显地标出位置，必须把点投影成一个垂直的线要素，如一根柱子、方尖碑或塔。应该注意，一个柱状要素，在平面上是被看作一个点的，因此保持着点的视觉特征。具有点的视觉特征的其他派生形式是：

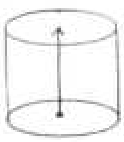
- **circle**
  圆





Tholos of Polycleitos, Epidauros, Greece, c. 350 B.C.
波利克雷特斯圆形神庙，埃皮达洛斯，希腊，公元前350年

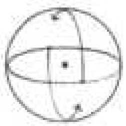
- **cylinder**
  圆柱体

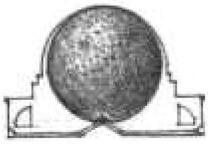




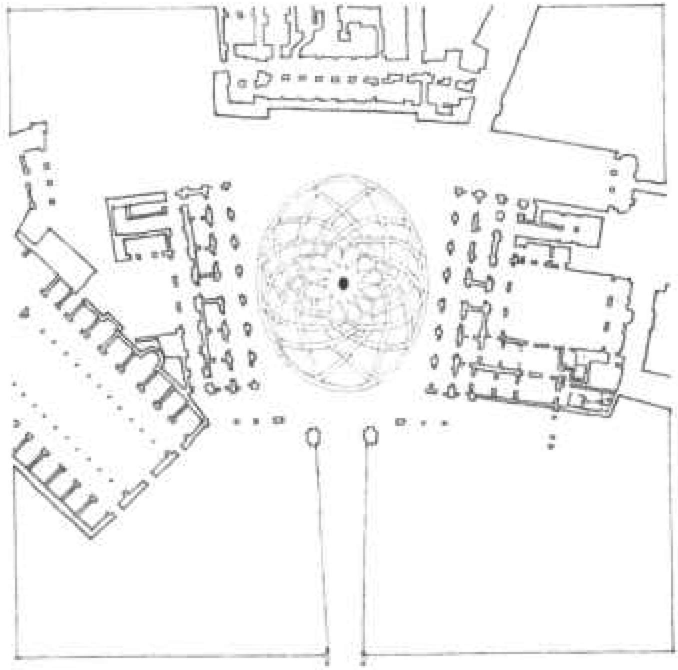
Baptistery at Pisa, Italy, 1153–1265, Dioti Salvi
比萨洗礼堂，意大利，1153年—1265年，D. 萨尔维

- **sphere**
  球体





Cenotaph for Sir Isaac Newton, Project, 1784, Étienne-Louis Boulé
I. 牛顿爵士纪念堂，方案，1784年，E-L. 布利



Piazza del Campidoglio, Rome, c. 1544, Michelangelo.
The equestrian statue of Marcus Aurelius marks the center of this urban space.

玫皮多格里奥广场，罗马，1544年，米开朗琪罗
M. 奥雷里亚斯皇帝的骑马塑像标识出这一城市空间的中心。

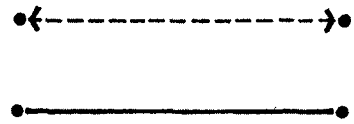


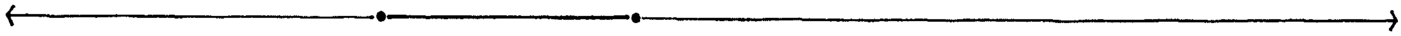
Mont S. Michel, France, 13th century and later.
The pyramidal composition culminates in a spire that serves to establish this fortified monastery as a specific place in the landscape.

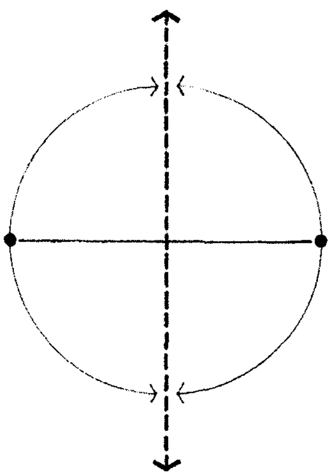
圣·米歇尔山，法国，始建于13世纪。
以尖塔为制高点的金字塔式构图使这座城堡式修道院成为风景中的一个特殊场所。

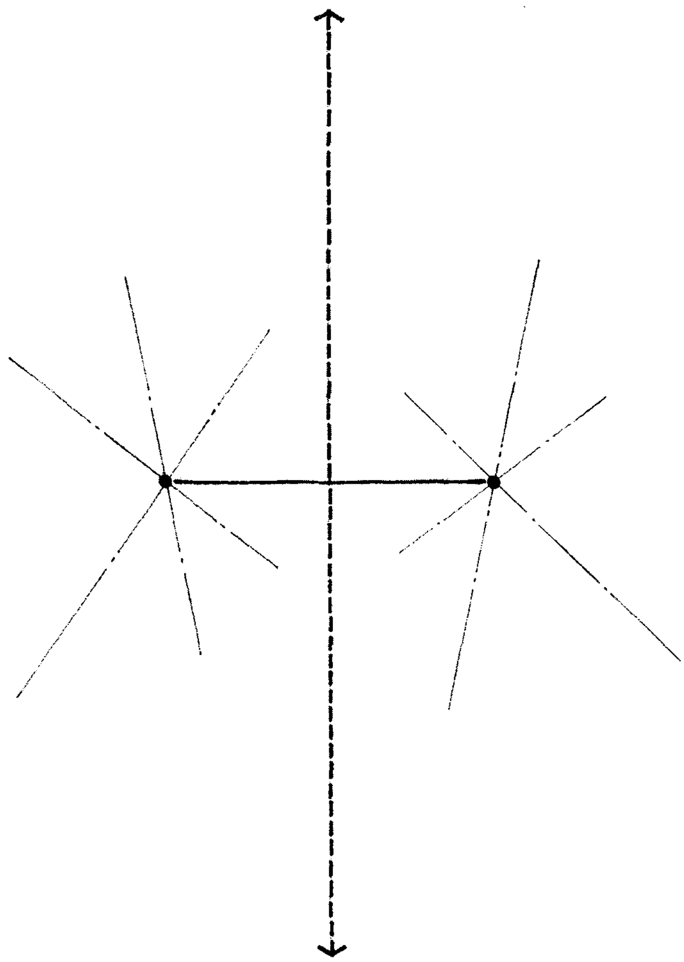
Two points describe a line that connects them. Although the points give this line finite length, the line can also be considered a segment of an infinitely longer path.

两点连起来是一条线。虽然两点使此线的长度有限，但此线也可以被认为是一条无限长轴上的一个线段。









Two points further suggest an axis perpendicular to the line they describe and about which they are symmetrical. Because this axis may be infinite in length, it can be at times more dominant than the described line.

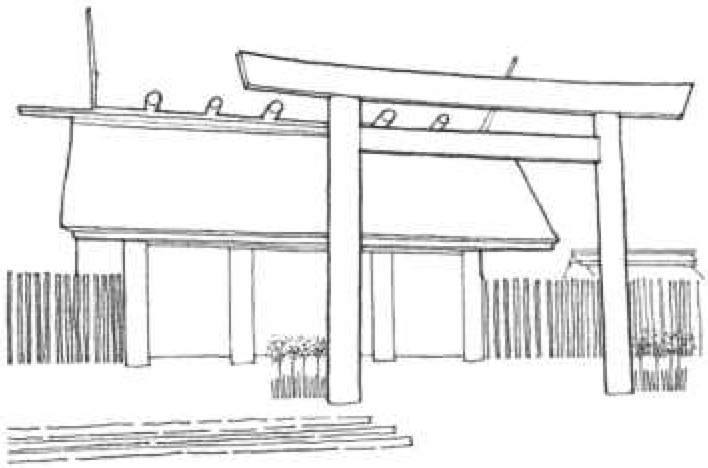
两点的连线也可以从视觉上暗示一条垂直于此连线的轴线，并且与之相对称。由于这条轴线可能是无限长的，所以在某种情况下，可能比所连成的直线更居于主导地位。

In both cases, however, the described line and the perpendicular axis are optically more dominant than the infinite number of lines that may pass through each of the individual points.

但是，在这两种情况下所连成的直线和垂直轴线，在视觉上要比在每个个别点上可能通过的无限多的直线更居于主导地位。

Two points established in space by columnar elements or centralized forms can define an axis, an ordering device used throughout history to organize building forms and spaces.

由空间中的柱状要素或集中式要素所形成的两个点，可以限定一条轴线。这是历史上惯用的做法，用来组合建筑形式和空间。

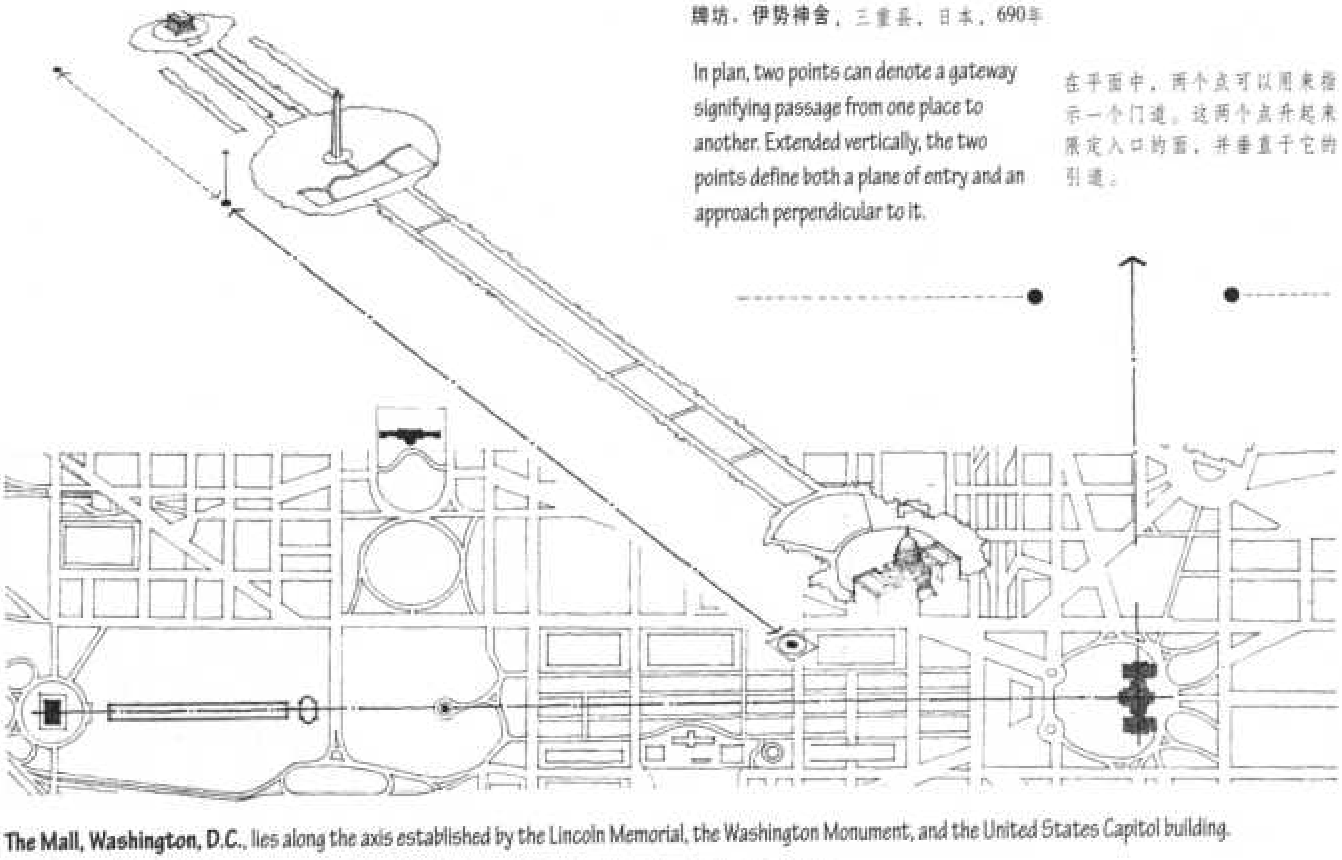


Torii, Ise Shrine, Mie Prefecture, Japan, A.D. 690

牌坊，伊势神舍，三重县，日本，690年

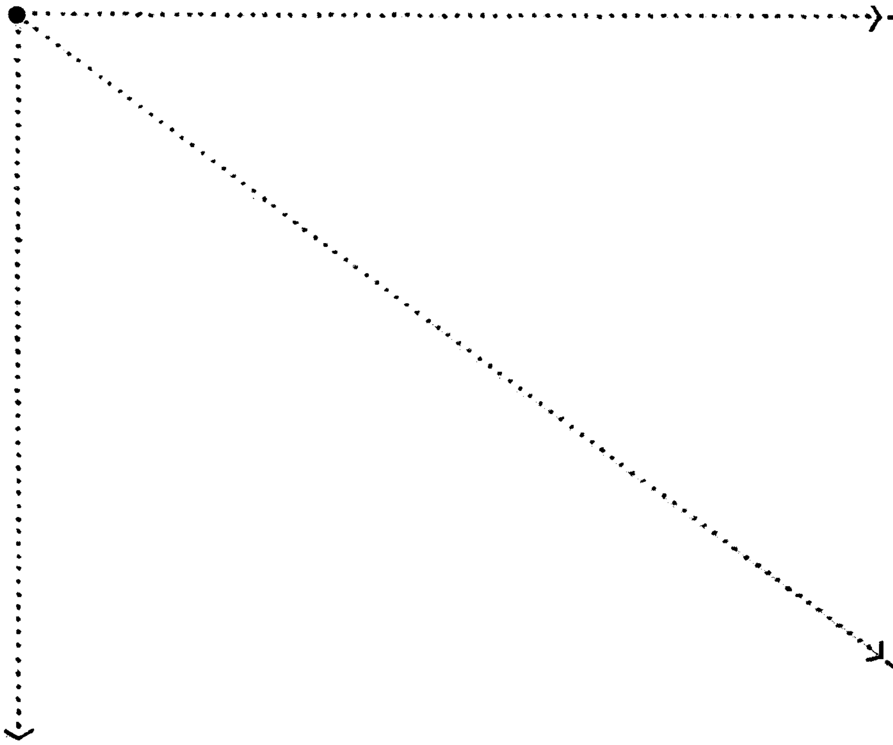
In plan, two points can denote a gateway signifying passage from one place to another. Extended vertically, the two points define both a plane of entry and an approach perpendicular to it.

在平面中，两个点可以用来指示一个门道。这两个点升起来限定入口的面，并垂直于它的引道。



The Mall, Washington, D.C., lies along the axis established by the Lincoln Memorial, the Washington Monument, and the United States Capitol building.

林阴大道，华盛顿特区，沿林肯纪念堂形成的轴线上，布置了华盛顿纪念碑和美国国会大厦。

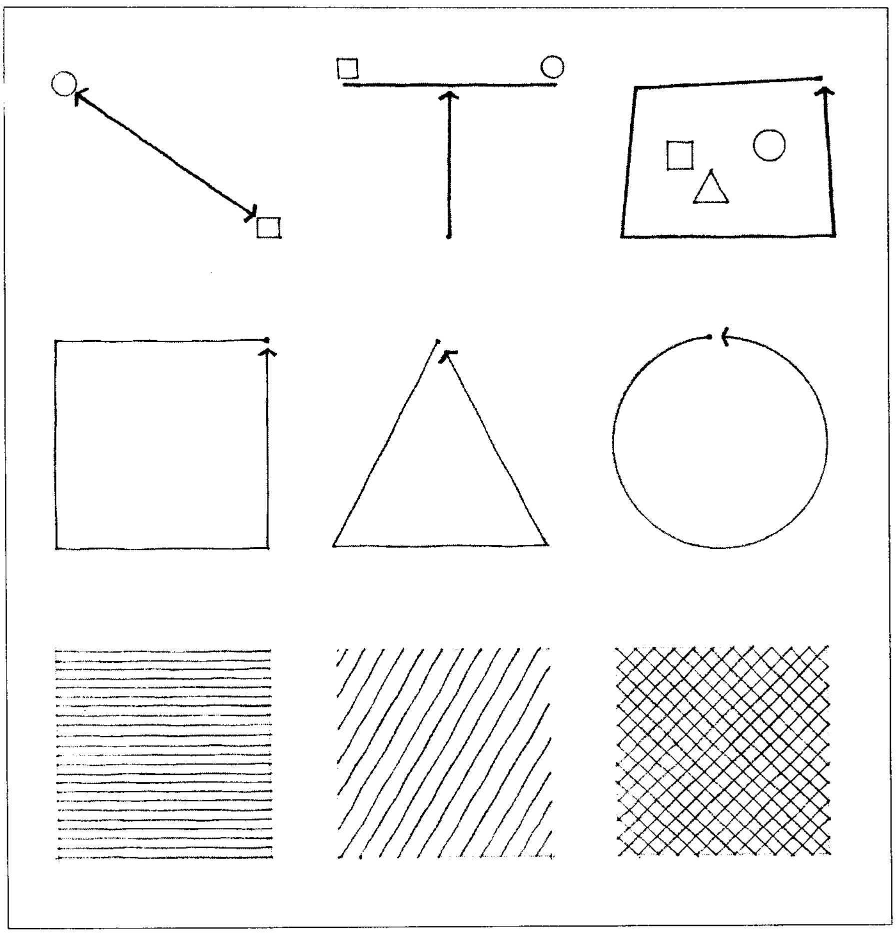


A point extended becomes a line. Conceptually, a line has length, but no width or depth. Whereas a point is by nature static, a line, in describing the path of a point in motion, is capable of visually expressing direction, movement, and growth.

点延伸而成为一条线。从概念上讲，一条线有长度，但没有宽度或深度。一个点就其本性而言是静止的，而一条线则用来描述一个点的运动轨迹，能够在视觉上表现出方向、运动和生长。

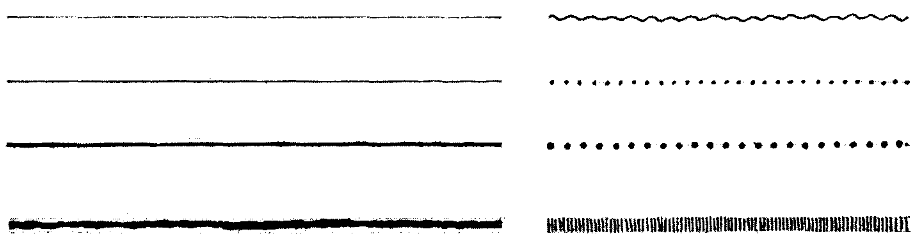
A line is a critical element in the formation of any visual construction.

线在任何视觉作品的形成过程中，都是一个重要的元素。



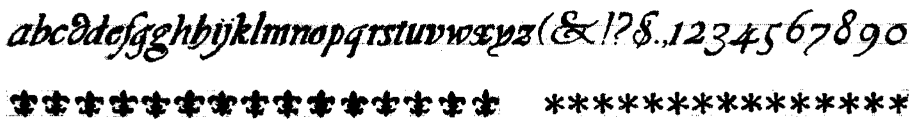
It can serve to:
它可以用来：

- join, link, support, surround, or intersect other visual elements
  连接、联系、支撑、包围或贯穿其他视觉要素
- describe the edges of and give shape to planes
  描绘面的轮廓，并给面以形状
- articulate the surfaces of planes
  表达平面的外观



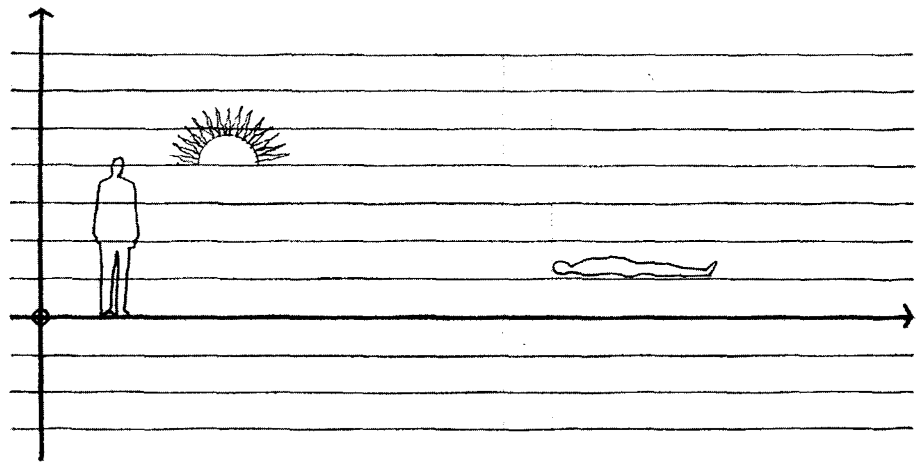
Although a line theoretically has only one dimension, it must have some degree of thickness to become visible. It is seen as a line simply because its length dominates its width. The character of a line, whether taut or limp, bold or tentative, graceful or ragged, is determined by our perception of its length–width ratio, its contour, and its degree of continuity.

尽管从理论上讲一条线只有一个量度，但它必须有一定的粗细才能看得见。它之所以被当成一条线，是因为其长度远远超过其宽度。一条线，不论是拉紧的还是放松的、粗壮的还是纤细的、流畅的还是参差的，它的特征都取决于我们对其长宽比、外轮廓及其连续程度的感知。



Even the simple repetition of like or similar elements, if continuous enough, can be regarded as a line. This type of line has significant textural qualities.

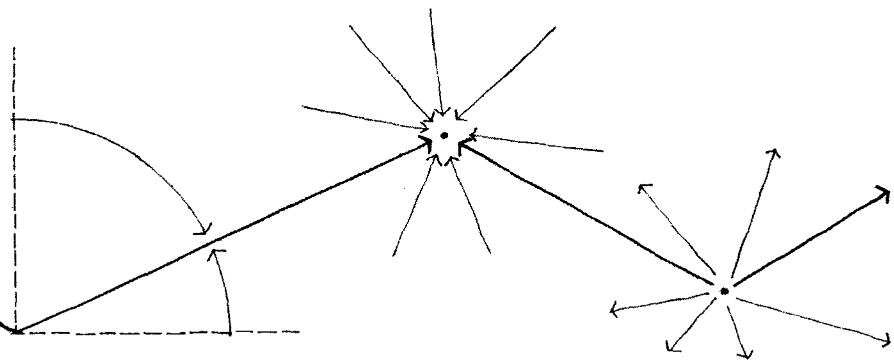
如果有同样或类似的要素作简单的重复，并达到足够的连续性，那也可以看成是一条线。这种类型的线具有重要的质感特征。



The orientation of a line affects its role in a visual construction. While a vertical line can express a state of equilibrium with the force of gravity, symbolize the human condition, or mark a position in space, a horizontal line can represent stability, the ground plane, the horizon, or a body at rest.

一条线的方向影响着它在视觉构成中所发挥的作用。一条垂直线可以表达一种与重力平衡的状态，表现人的状况，或者标识出空间中的一个位置。一条水平线，可以代表稳定性、地平面、地平线或者平躺的人体。

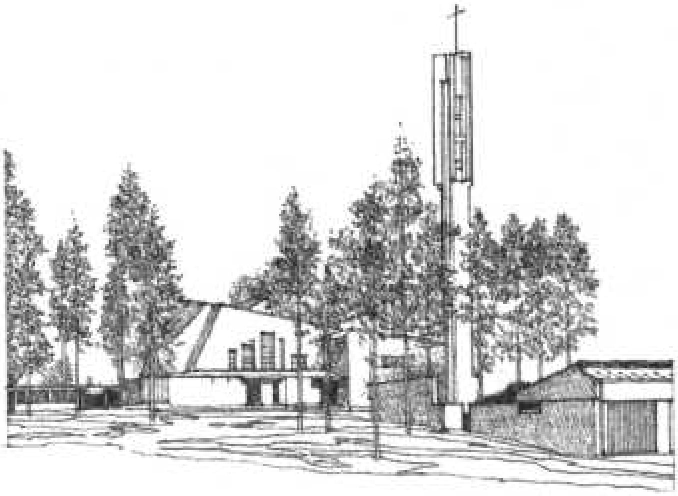
An oblique line is a deviation from the vertical or horizontal. It may be seen as a vertical line falling or a horizontal line rising. In either case, whether it is falling toward a point on the ground plane or rising to a place in the sky, it is dynamic and visually active in its unbalanced state.



偏离水平或垂直的线为斜线。斜线可以看作垂直线正在倾倒或水平线正在升起。不论是垂直线朝地上的一点倒下，还是水平线向天空的某处升起，斜线都是动态的，是视觉上的活跃因素，因为它处于不平衡状态。

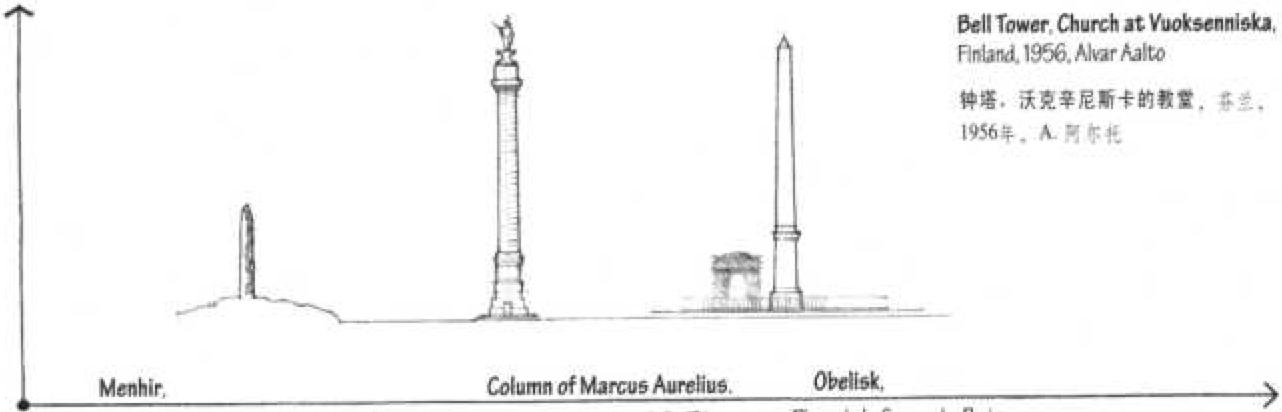
Vertical linear elements, such as columns, obelisks, and towers, have been used throughout history to commemorate significant events and establish particular points in space.

垂直的线要素，如柱子、方尖碑和塔，在历史上已被广泛采用，用来纪念重大事件并在空间中建立起特定的点。



Bell Tower, Church at Vuoksenniska, Finland, 1956, Alvar Aalto

钟塔，沃克辛尼斯卡的教堂，芬兰，1956年，A. 阿尔托



Menhir, a prehistoric monument consisting of an upright megalith, usually standing alone but sometimes aligned with others.

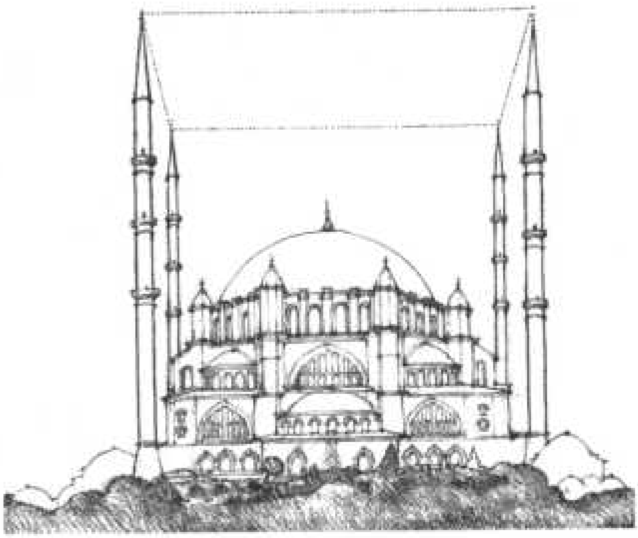
Column of Marcus Aurelius, Piazza Colonna, Rome, A.D. 174. This cylindrical shaft commemorates the emperor's victory over Germanic tribes north of the Danube.

Obelisk, Place de la Concorde, Paris

史前纪念石柱
一座史前的纪念碑，由竖直向上的巨石构成，通常是独立的，有时是与其他石柱一起成行排列。

M.奥雷里亚斯柱
圆柱广场，罗马，174年
这个圆柱形的石柱是为了纪念皇帝征服多瑙河北部的日耳曼部落而建的。

方尖碑
协和广场，巴黎



Vertical linear elements can also define a transparent volume of space. In the example illustrated to the left, four minaret towers outline a spatial field from which the dome of Hagia Sophia rises in splendor.

垂直的线要素也可以限定一个明晰的空间形状。左图表明，四个伊斯兰尖塔勾勒出一片空间领域，圣·索菲亚教堂的穹顶在这一领域中壮观地升起。

Sultan Selin Mosque, Builder: Sinan. Edirne, Turkey. A.D. 1569–1575

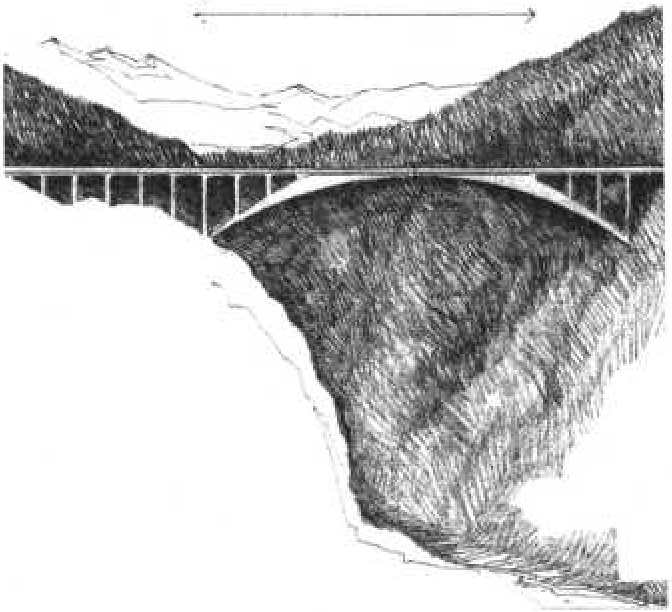
苏丹赛林清真寺，建设者：S. 艾迪恩，土耳其，1569年—1575年

Linear members that possess the necessary material strength can perform structural functions. In these three examples, linear elements:

- express movement across space
- provide support for an overhead plane
- form a three-dimensional structural frame for architectural space

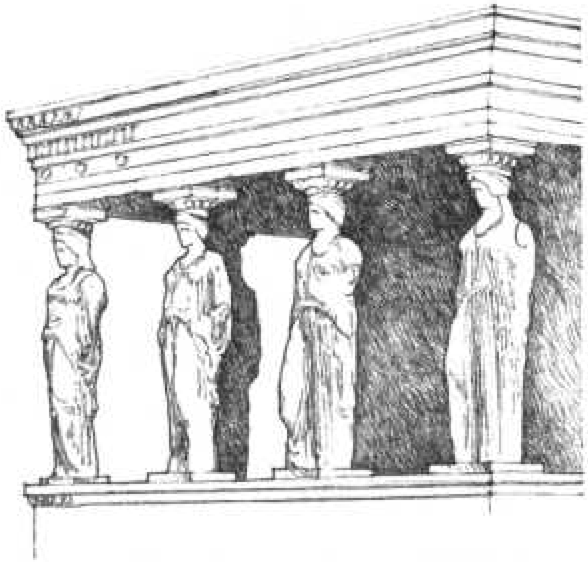
拥有必要的材料强度的线要素能够发挥结构的作用。在这三个实例中，线要素具有：

- 表现穿越空间的运动
- 为顶面提供支撑
- 形成三度的结构框架以包容建筑空间



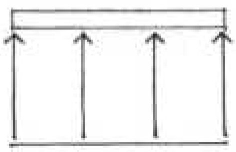
Salginatobel Bridge, Switzerland, 1929–1930, Robert Maillart.
Beams and girders have the bending strength to span the space between their supports and carry transverse loads.

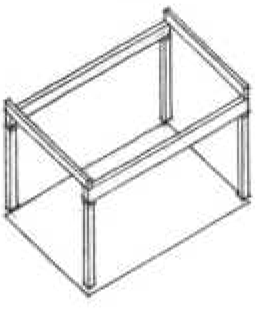
萨尔金纳托贝尔大桥，瑞士，1929年—1930年，R.梅拉特
柱与梁具有抗弯强度，从而能够跨越支撑体之间的空间并承担横向荷载。

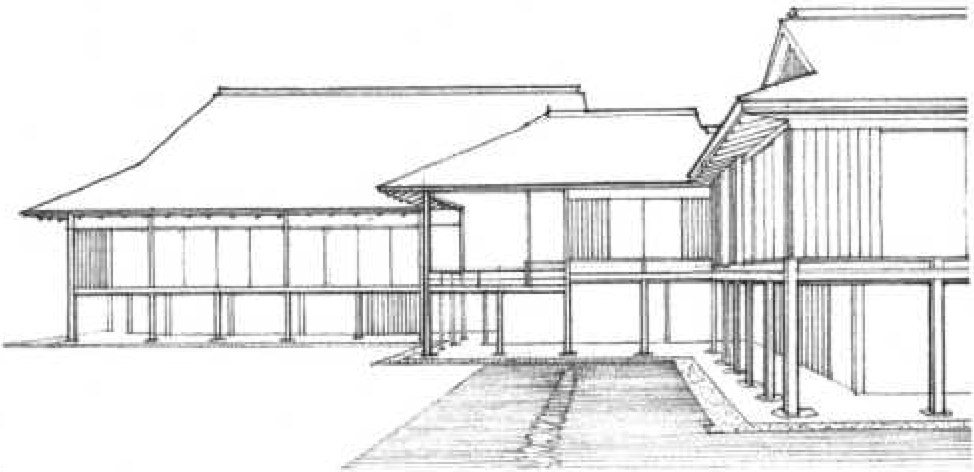


Caryatid Porch, The Erechtheion, Athens, 421–405 B.C., Mnesicles.
The sculptured female figures stand as columnar supports for the entablature.

女像柱廊，伊瑞克提翁神庙，雅典，公元前421年—公元前405年，穆尼西克里
雕塑女像是檐口的支柱。

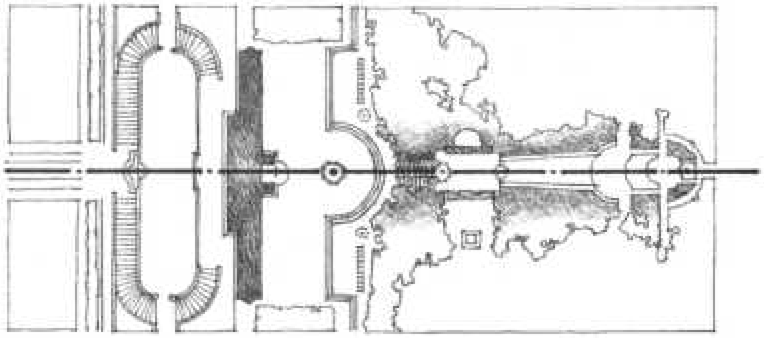






Katsura Palace, Kyoto, Japan, 17th century.
Linear columns and beams together form a three-dimensional framework for architectural space.

桂离宫，京都，日本，17世纪
为包容建筑空间，线式的梁与柱共同形成三度框架。

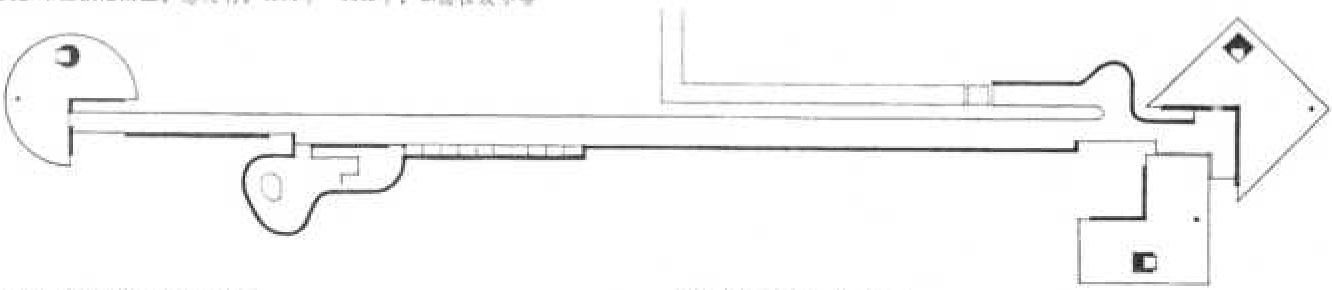


Villa Aldobrandini, Italy, 1598–1603, *Giacomo Della Porta*

奥多布兰狄尼别墅，意大利，1598年—1603年，G.德拉波尔塔

A line can be an imagined element rather than a visible one in architecture. An example is the axis, a regulating line established by two distant points in space and about which elements are symmetrically arranged.

在建筑中，一条线可以是假想的要素而不是一条真实可见的线。轴线就是一个例子，它是在空间中两个彼此分离的点之间建立的控制线，各要素则相对于轴线对称安排。



House 10, 1966, *John Hejduk*

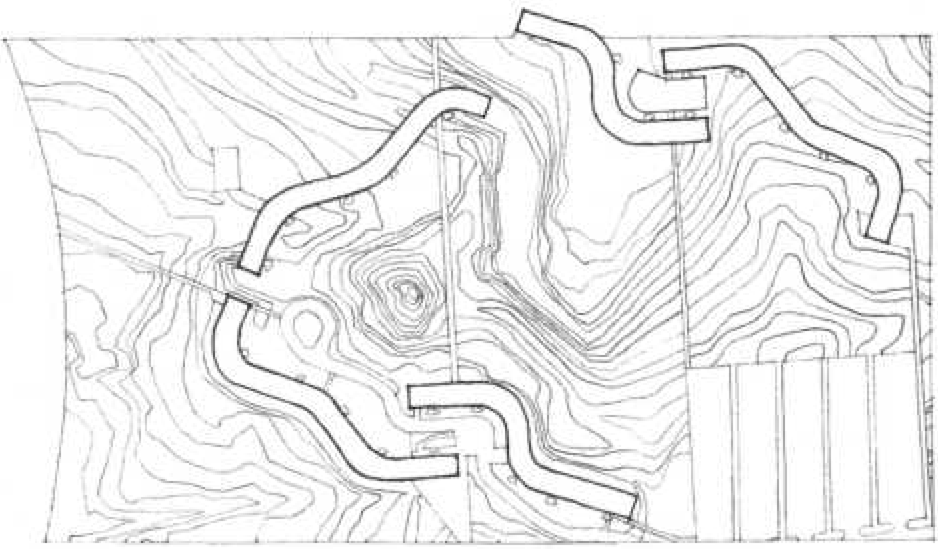
住宅10，1966年，J.海杜克

Although architectural space exists in three dimensions, it can be linear in form to accommodate the path of movement through a building and link its spaces to one another.

虽然建筑空间存在于三个量度之中，但其形式可以是线式的，以适应穿越建筑物的运动轨迹，并使其空间与其他空间彼此相连。

Buildings also can be linear in form, particularly when they consist of repetitive spaces organized along a circulation path. As illustrated here, linear building forms have the ability to enclose exterior spaces as well as adapt to the environmental conditions of a site.

建筑的形式也可以是线式的，特别是建筑中包含着沿交通流线组织的重复性空间时。如图所示，线式建筑形式能够围合外部空间，也能够适应基地的环境状况。



Cornell University Undergraduate Housing, Ithaca, New York, 1974, Richard Meier

康奈尔大学本科生公寓，伊萨卡，纽约，1974年，R.迈耶

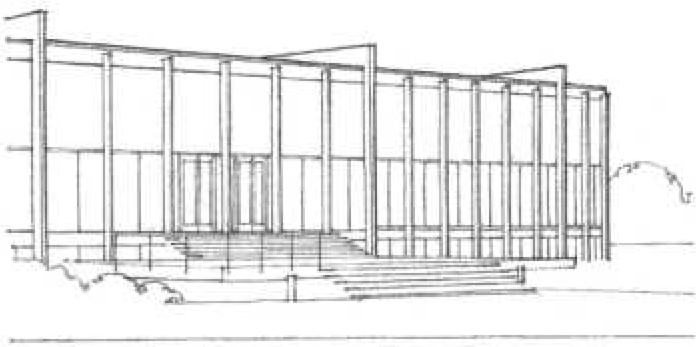


Town Hall, Säynätsalo, Finland, 1950–1952, Alvar Aalto

市政厅，赛纳特萨罗，芬兰，1950年—1952年，A.阿尔托

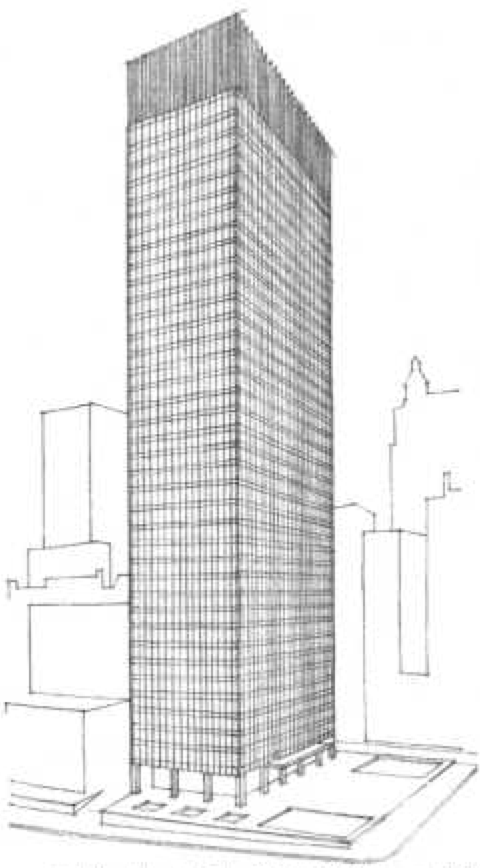
At a smaller scale, lines articulate the edges and surfaces of planes and volumes. These lines can be expressed by joints within or between building materials, by frames around window or door openings, or by a structural grid of columns and beams. How these linear elements affect the texture of a surface will depend on their visual weight, spacing, and direction.

在尺度较小的情况下，线能够清楚地表明面的边界和体量的各表面。这些线可以表现为建筑材料之中或建筑材料之间的结合处、窗或门洞周围的框子，或者是梁和柱组成的结构网格。这些线式要素，对建筑表面质感的影响程度取决于它们的视觉分量、间距和方向。



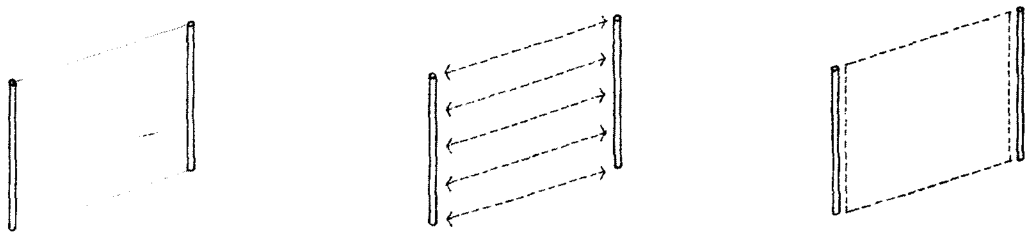
Crown Hall, School of Architecture and Urban Design, Illinois Institute of Technology, Chicago, 1956, Mies van der Rohe

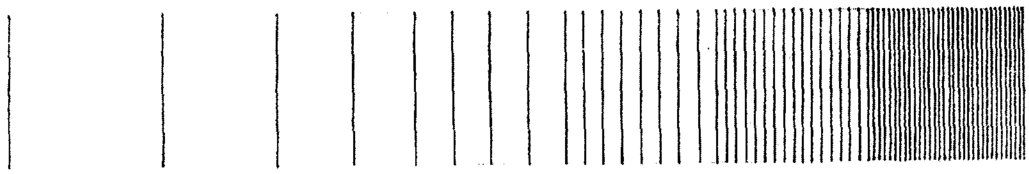
皇冠厅，建筑与城市设计学院，伊利诺斯理工学院，芝加哥，1956年，密斯·凡德罗

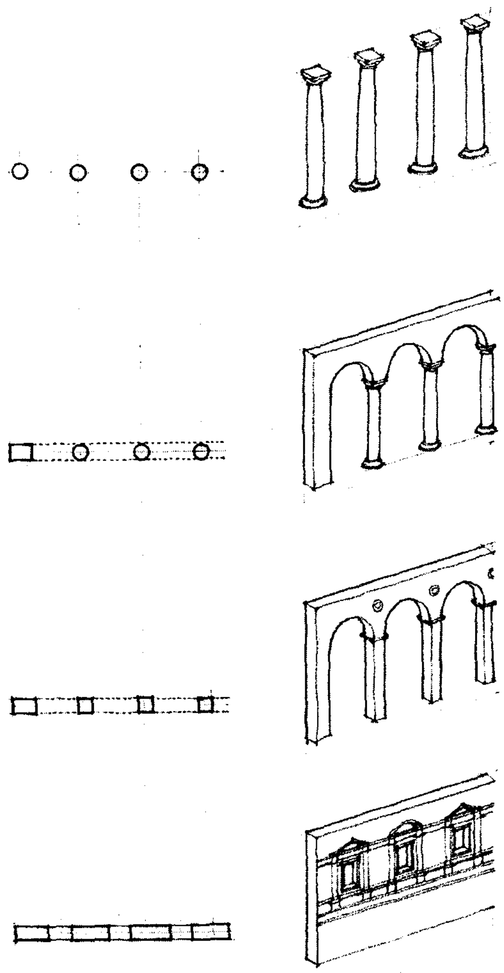


Seagram Building, New York City, 1956–1958, Mies van de Rohe and Philip Johnson

西格拉姆大厦，纽约市，1956年—1958年，密斯·凡德罗和P.约翰逊







Two parallel lines have the ability to visually describe a plane. A transparent spatial membrane can be stretched between them to acknowledge their visual relationship. The closer these lines are to each other, the stronger will be the sense of plane they convey.

两条平行线能够在视觉上确定一个平面。一块透明的空间薄膜能够在两条线之间伸展，从而使人们意识到两条线之间的视觉关系。这些线彼此之间离得越近，它们所表现的平面感也就越强。

A series of parallel lines, through their repetitiveness, reinforces our perception of the plane they describe. As these lines extend themselves along the plane they describe, the implied plane becomes real and the original voids between the lines revert to being mere interruptions of the planar surface.

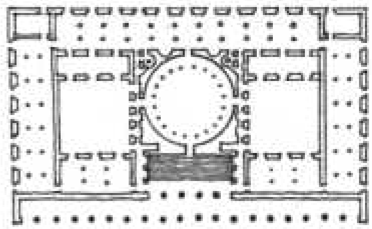
一系列的平行线，通过不断重复就会强化我们对于这些线所确定的平面的感知。当这些线沿着它们所确定的平面不断延伸时，原来暗示的面就变成了实际的面，原本存在于线之间的空白则转变成平面之间的间断。

The diagrams illustrate the transformation of a row of round columns, initially supporting a portion of a wall, then evolving into square piers which are an integral part of the wall plane, and finally becoming pilasters—remnants of the original columns occurring as a relief along the surface of the wall.

左图表明了一排圆柱的转变过程，起先柱子支撑着部分墙体；后来发展成为方形的柱墩，成为墙面的必要组成部分；最后变成了壁柱——即原来柱子的遗痕，仅仅是沿着墙面的凸起而已。

"The column is a certain strengthened part of a wall, carried up perpendicular from the foundation to the top . . . A row of columns is indeed nothing but a wall, open and discontinued in several places." *Leon Battista Alberti*

“柱子是墙体的某种加固部分，从基础到顶部垂直向上……一排柱子其实不是别的，而是一面开放的、有若干处间断的墙体。”（L. B.阿尔伯蒂）



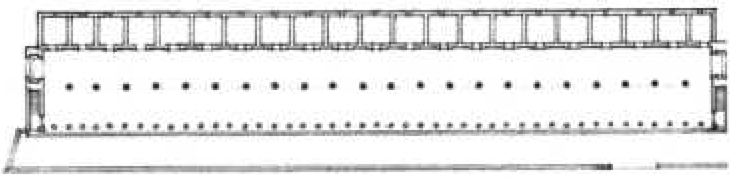


Altes Museum, Berlin, 1823–1830, Karl Friedrich von Schinkel

阿尔蒂斯博物馆，柏林，1823年—1830年，K.F.冯·辛克尔

A row of columns supporting an entablature—a colonnade—is often used to define the public face or facade of a building, especially one that fronts on a major civic space. A colonnaded facade can be penetrated easily for entry, offers a degree of shelter from the elements, and forms a semi-transparent screen that unifies individual building forms behind it.

一排柱子支撑着建筑物的顶部，即柱廊，常常用来表达建筑物的公共面孔或正立面，特别是面对主要城市空间的立面。柱廊式的正立面能够使人一目了然看到入口。这些柱子在一定程度上提供了遮风避雨的场所，并形成一层半透明的帘幕。这层帘幕使其背后的个体建筑形式得到统一。

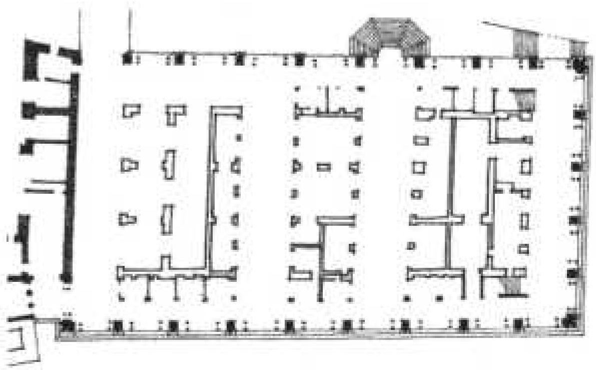


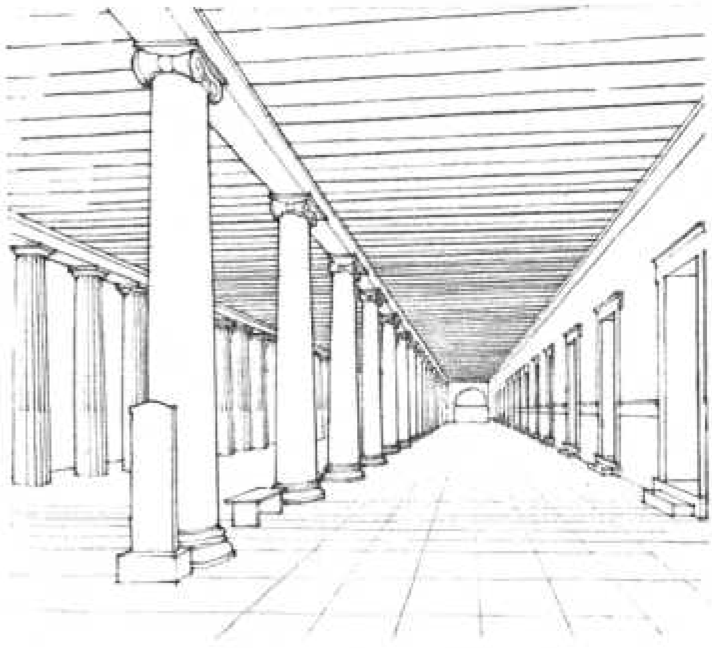
The Basilica, Vicenza, Italy.

Andrea Palladio designed this two-story loggia in 1545 to wrap around an existing medieval structure. This addition not only buttressed the existing structure but also acted as a screen that disguised the irregularity of the original core and presented a uniform but elegant face to the Piazza del Signori.

巴西利卡，维琴察，意大利

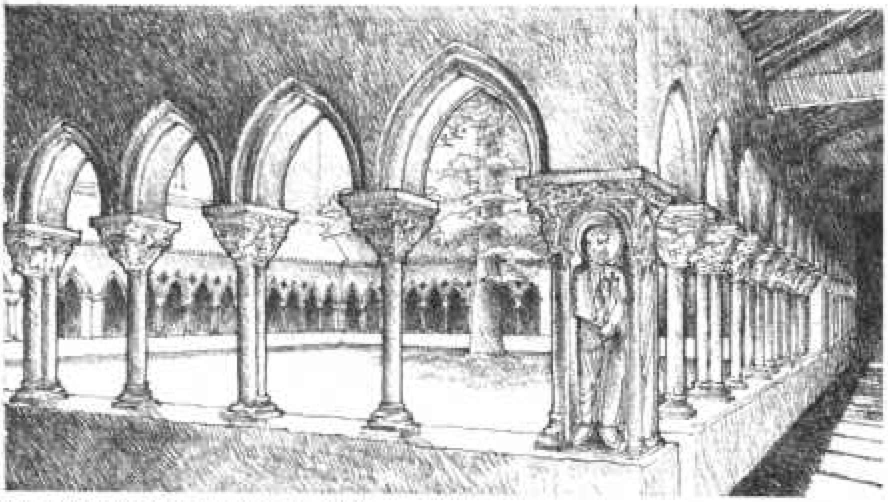
A.帕拉蒂奥在1545年设计的这座两层高的外廊，包围着一座原有的中世纪建筑。这个加建物不仅加固了原有的结构，而且也起到了屏风的作用，把原来不整齐的内核乔装了一番，给辛约里广场呈上统一而优雅的形象。

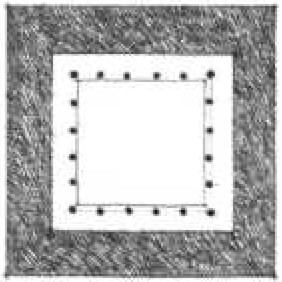




Stoa of Attalus fronting the Agora, Athens

阿塔洛斯回廊，正对会场，雅典





Cloister of Moissac Abbey, France, c. 1100

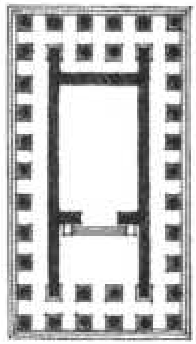
莫瓦萨修道院回廊，法国，1100年

In addition to the structural role columns play in supporting an overhead floor or roof plane, they can articulate the penetrable boundaries of spatial zones which mesh easily with adjacent spaces.

列柱除了起到支撑上面楼板或屋面的结构作用之外，还可以清楚地表明可见空间区域的外轮廓，同时又能使这些空间很容易地与临近空间相结合。

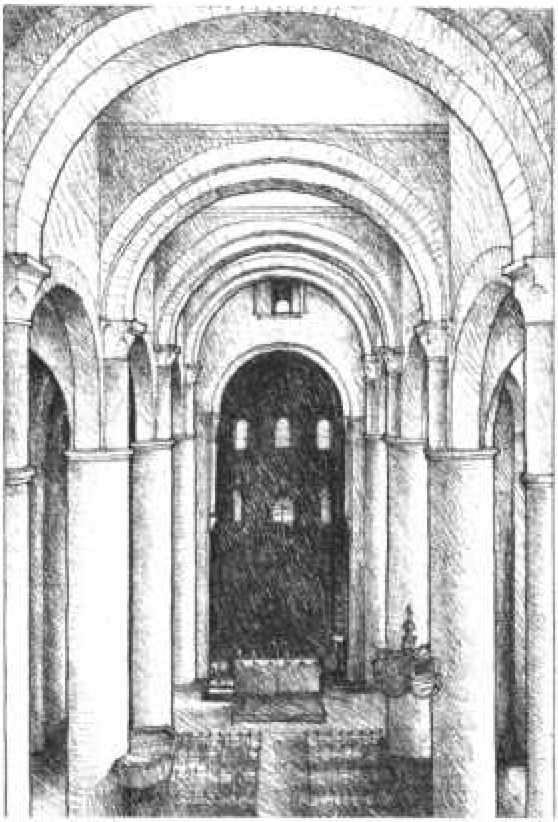
These two examples illustrate how columns can define the edges of an exterior space defined within the mass of a building as well as articulate the edges of a building mass in space.

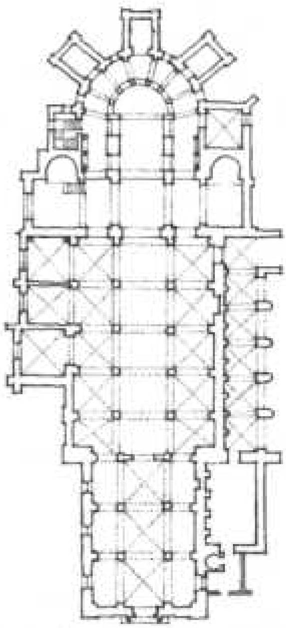
这两个实例说明，柱子能够表明建筑体量内部所限定的外部空间的界限，同样也能勾勒出空间中建筑体量的界限。



Temple of Athena Polias, Priene, c. 334 B.C., Pythius

雅典娜·波利亚神庙，普里恩，公元前334年，菲迪亚斯





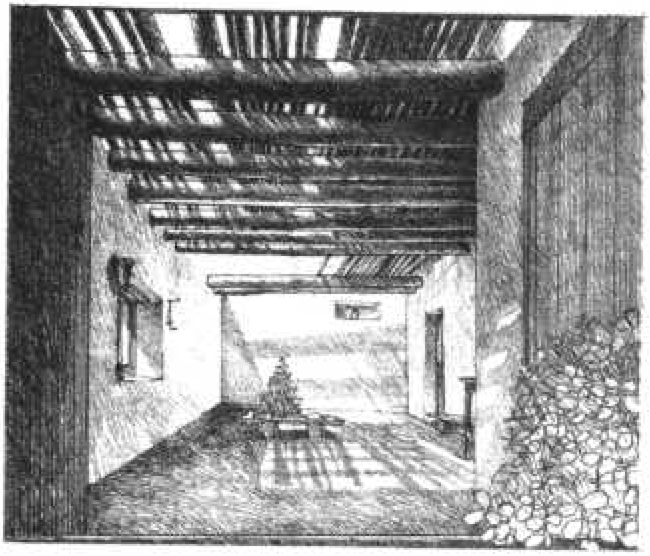
St. Philibert, Tournus, France, 950–1120. This view of the nave shows how rows of columns can provide a rhythmic measure of space.

圣·菲利伯大教堂，图纳，法国，950年—1120年 这幅教堂中殿的图景显示出，成排的柱子能够形成富有节奏的空间韵律。



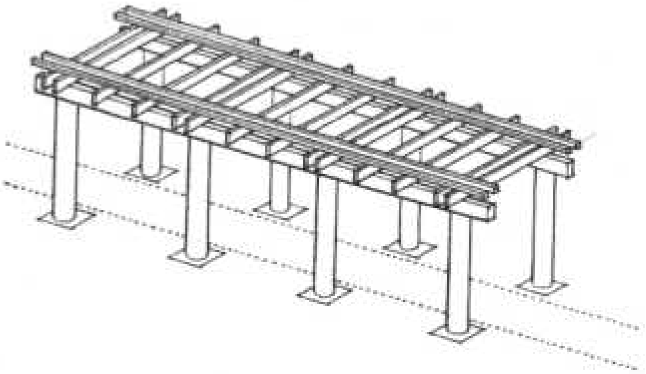
Cary House, Mill Valley, California, 1963, Joseph Esherick

卡里住宅，米尔山谷，加利福尼亚州，1963年，J.埃舍里克



Trellised Courtyard, Georgia O'Keefe Residence, Abiquiu, northwest of Sante Fe, New Mexico

带有格架的庭院，乔治亚·奥基弗住宅，阿比丘，圣特菲西北部，新墨西哥州



The linear members of trellises and pergolas can provide a moderate degree of definition and enclosure for outdoor spaces while allowing filtered sunlight and breezes to penetrate.

由棚架形成的线式构件，能够适度地限定和围合外部空间，同时又能让阳光和微风穿越其间。

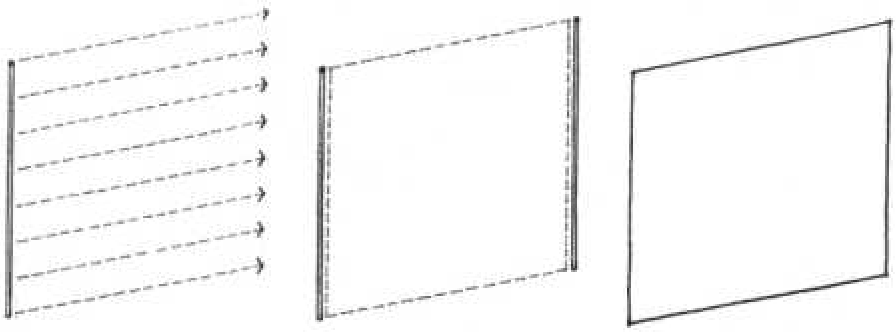
Vertical and horizontal linear elements together can define a volume of space such as the solarium illustrated to the right. Note that the form of the volume is determined solely by the configuration of the linear elements.

垂直和水平的线要素组合在一起，可以限定一个空间容积，如右图所示的日光浴室。请注意，其体量的形式完全是由线要素的布局所决定的。



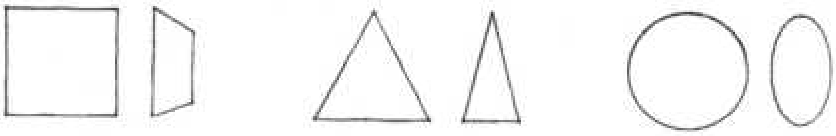
Solarium of Condominium Unit 1, Sea Ranch, California, 1966, MLTW

公共日光浴室一号单元，瑞奇海滨，加利福尼亚州，1966年，MLTW



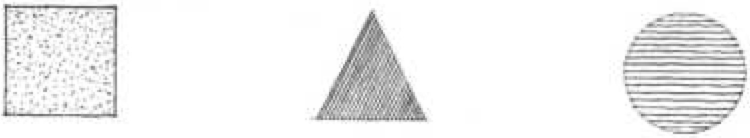
A line extended in a direction other than its intrinsic direction becomes a plane. Conceptually, a plane has length and width, but no depth.

一条线沿着不同于自身的延伸方向展开时变成一个面。从概念上讲，一个面有长度和宽度，但没有深度。



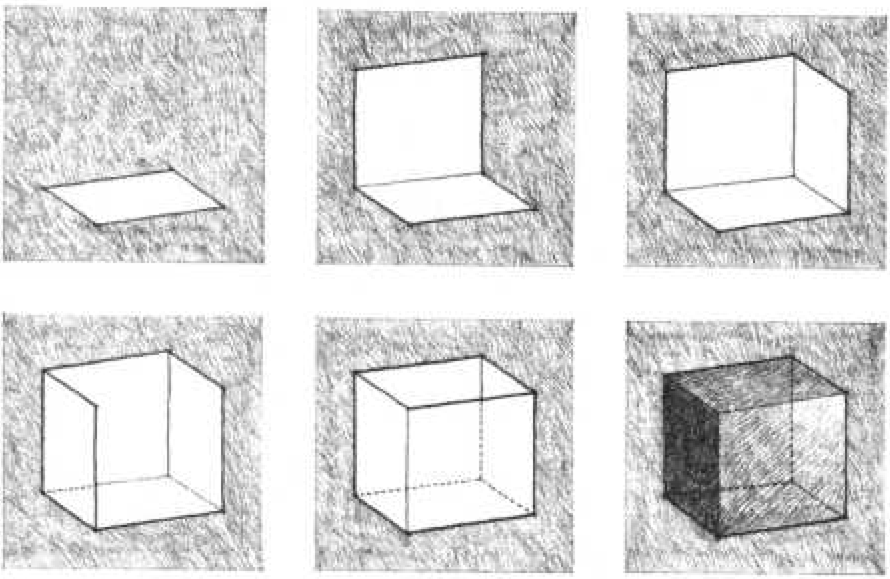
Shape is the primary identifying characteristic of a plane. It is determined by the contour of the line forming the edges of a plane. Because our perception of shape can be distorted by perspective foreshortening, we see the true shape of a plane only when we view it frontally.

一个面的首要识别特征是形状。它决定于形成面之边界的轮廓线。我们对于形状的感知会因为透视错觉而失真，所以只有正对一个面的时候才能看到面的真实形状。



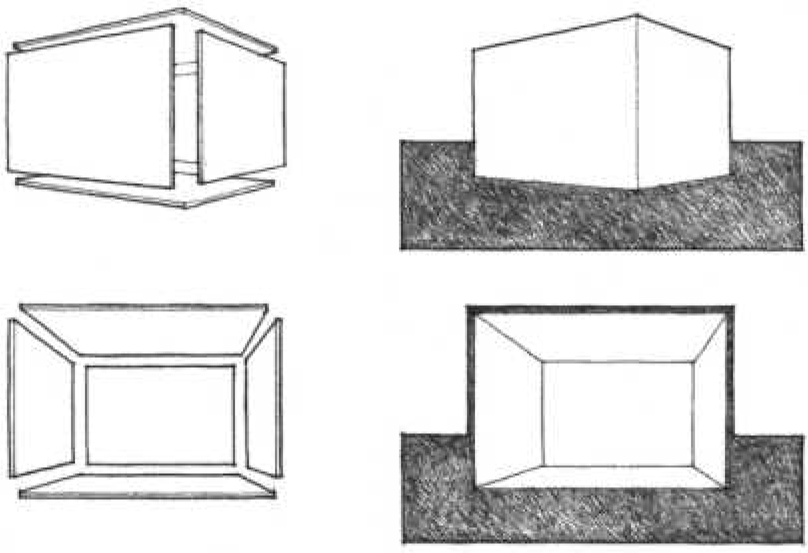
The supplementary properties of a plane—its surface color, pattern, and texture—affect its visual weight and stability.

一个面的其他属性，如表面的色彩、图案和纹理，影响着面的视觉重量感和稳定性。



In the composition of a visual construction, a plane serves to define the limits or boundaries of a volume. If architecture as a visual art deals specifically with the formation of three-dimensional volumes of mass and space, then the plane should be regarded as a key element in the vocabulary of architectural design.

在视觉艺术品的构成中，面起着限定容积界限的作用。如果作为视觉艺术的建筑是专门用来处理体量与空间的三度容量问题的，那么在建筑设计的语汇中，面就应该被看作一个关键的要素。



Planes in architecture define three-dimensional volumes of mass and space. The properties of each plane—size, shape, color, texture —as well as their spatial relationship to one another ultimately determine the visual attributes of the form they define and the qualities of the space they enclose.

建筑中的面限定着体量与空间的三度容量。每个面的特性，如尺寸、形状、色彩、质感，还有面与面之间的空间关系，最终决定了这些面限定的形式所具有的视觉特征，以及这些面所围合的空间质量。

In architectural design, we manipulate three generic types of planes:

在建筑设计中，我们常用三种类型的面：

Overhead Plane

The overhead plane can be either the roof plane that shelters the interior spaces of a building from the climatic elements, or the ceiling plane that forms the upper enclosing surface of a room.

顶面

顶面可以是屋顶平面，它遮蔽建筑内部空间免受气候因素的影响；也可以是天花板面，即闭合房间的上表面。

Wall Plane

The wall plane, because of its vertical orientation, is active in our normal field of vision and vital to the shaping and enclosure of architectural space.

墙面

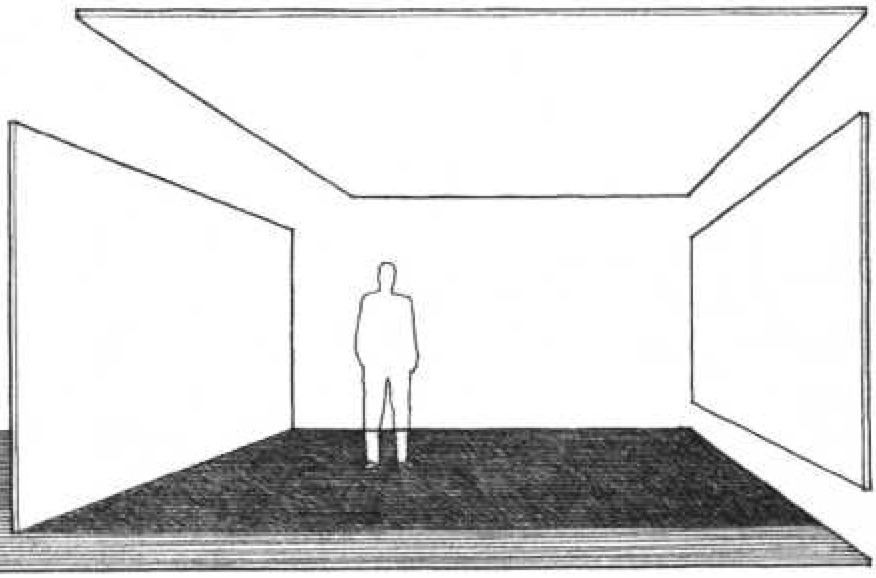
墙面因为具有垂直的方向性，因此在我们通常的视野中是很活跃的，并且对于建筑空间的塑造与围合至关重要。

Base Plane

The base plane can be either the ground plane that serves as the physical foundation and visual base for building forms, or the floor plane that forms the lower enclosing surface of a room upon which we walk.

基面

基面可以是地面，它既是建筑形式的有形底座又是建筑的视觉基面；基面也可以是楼板平面，它形成了底层房间的闭合表面，可供人们在上面行走。





The ground plane ultimately supports all architectural construction. Along with climate and other environmental conditions of a site, the topographical character of the ground plane influences the form of the building that rises from it. The building can merge with the ground plane, rest firmly on it, or be elevated above it.

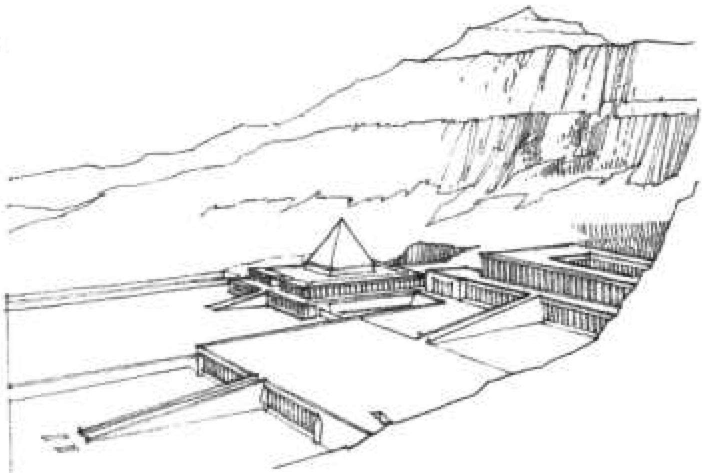
The ground plane itself can be manipulated as well to establish a podium for a building form. It can be elevated to honor a sacred or significant place; bermed to define outdoor spaces or buffer against undesirable conditions; carved or terraced to provide a suitable platform on which to build; or stepped to allow changes in elevation to be easily traversed.

从根本上讲，地面支撑着所有建筑结构。伴随着基地的气候条件以及其他环境因素，地面的地形特征影响着立于其上的建筑形式。建筑可以与地面融合在一起，与地面紧密结合，也可以从地面上拔地而起。

地面本身也可以经过处理而成为某一建筑形式的基座。它可以抬高以对某一神圣或重要场所表示尊敬；可以筑路围堤来限定室外空间或缓冲不良状况；可以切割或修成台地，为建筑提供一个合适的平台；或者修成阶梯状可以变化高差又便于跨越。

Scala de Spagna (Spanish Steps), Rome, 1721–1725.
Alessandro Specchi designed this civic project to connect the Piazza di Spagna with SS. Trinita de' Monti; completed by Francesco de Sanctis.

西班牙台阶，罗马，1721年—1725年
A.斯佩奇设计了这一市政工程，把西班牙广场与天主圣三教堂相连；由F.德萨克蒂斯完成。



Mortuary Temple of Queen Hatshepsut,
Dêr el-Bahari, Thebes,1511–1480 B.C., Senmut.
Three terraces approached by ramps rise toward the base of the cliffs where the chief sanctuary is cut deep into the rock.

哈特什帕苏女王灵殿，戴尔·埃尔—巴哈利，底比斯，公元前1511年—公元前1480年，森穆特
三层台地由坡道相连逐渐升高通向峭壁的底部，在那里主圣殿深深地嵌在岩石之中。

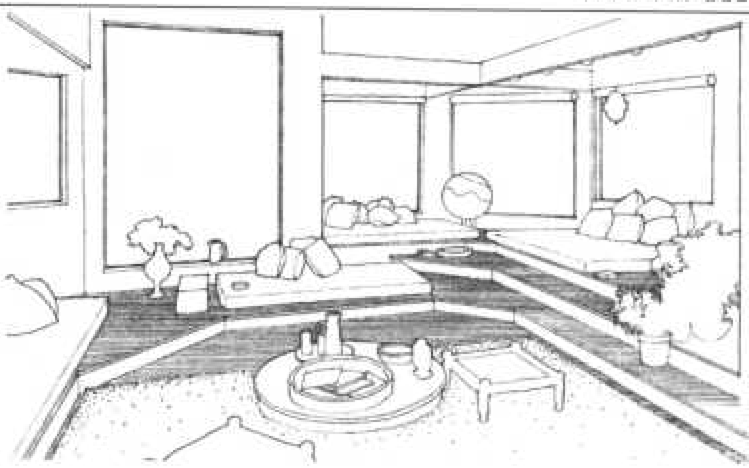


Machu Picchu, an ancient Incan city established c.1500 in the Andes Mountains on a saddle between two peaks, 8000 ft. above the Urubamba River in south-central Peru.

马丘比丘，一座古代的印加城市，建于1500年，位于安第斯山脉两座山峰之间的鞍形地带，比秘鲁南部中心地带的乌鲁班巴河高出8 000英尺。

Sitting Area, Lawrence House,
Sea Ranch, California, 1966,
MLTW/Moore-Turnbull

起居地带，劳伦斯住宅，瑞奇海滨，加利福尼亚州，1966年，MLTW/穆尔和特恩布尔



The floor plane is the horizontal element that sustains the force of gravity as we move around and place objects for our use on it. It may be a durable covering of the ground plane or a more artificial, elevated plane spanning the space between its supports. In either case, the texture and density of the flooring material influences both the acoustical quality of a space and how we feel as we walk across its surface.

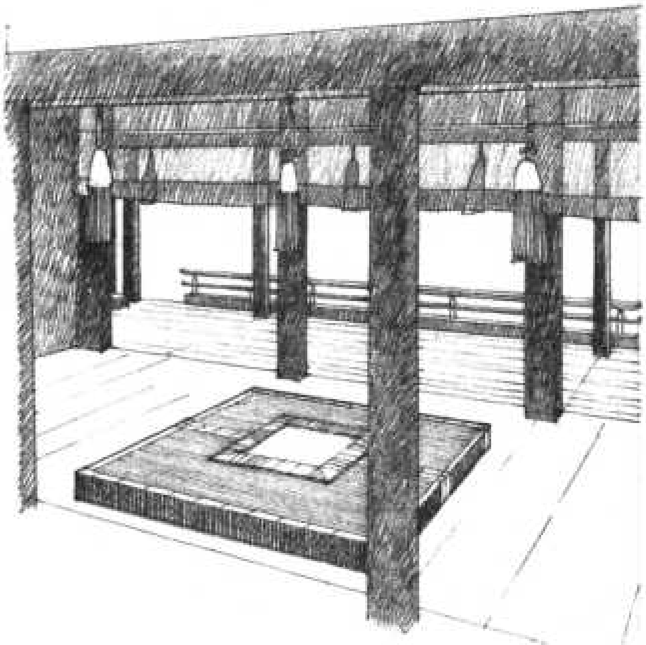
当我们在楼板上四处走动并把所需物件放在楼板上的时候，楼板是支撑重力的水平要素。楼板可能是由地面形成的坚固的壳，也可能是一种更加人工化的、抬高了的平面，架在支撑体之间的跨越空间。无论是哪种情形，地板材料的质感与密度，都影响着空间的声学特性以及我们跨越楼板表面时的感受。

While the pragmatic, supportive nature of the floor plane limits the extent to which it can be manipulated, it is nonetheless an important element of architectural design. Its shape, color, and pattern determine to what degree it defines spatial boundaries or serves as a unifying element for the different parts of a space.

同时，楼板平面的实用性与支撑功能限制着它被艺术处理的程度。毫无疑问，楼板是建筑设计的重要因素。楼板的形状、色彩和图案，决定着它将空间的界线限定到什么程度，或者作为空间中不同部位的统一要素。

Like the ground plane, the form of a floor plane can be stepped or terraced to break the scale of a space down to human dimensions and create platforms for sitting, viewing, or performing. It can be elevated to define a sacred or honorific place. It can be rendered as a neutral ground against which other elements in a space are seen as figures.

像地面一样，楼板的形式也可以处理成阶梯或台地，目的是把空间的尺度分解成人性化的量度，并形成可以坐卧、观景或表演的平台。楼面也可以被抬高来限定一个神圣或庄严的场所。楼板还可以被表现为一个中性的基面，以这一基面为背景，空间中的其他要素则被视为主角。

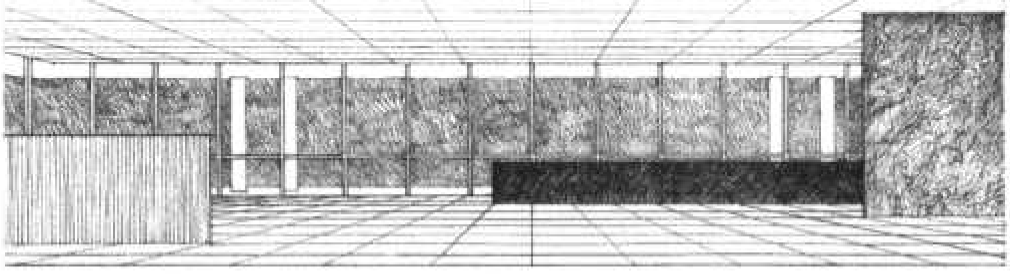


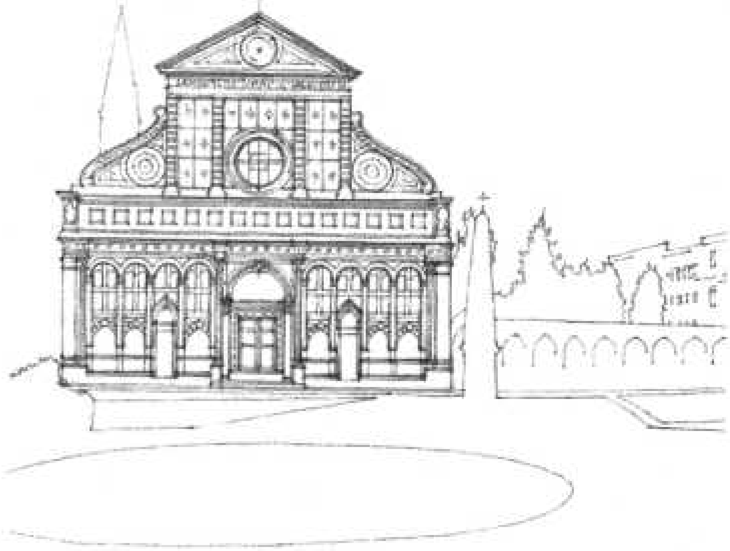
Emperor's Seat, Imperial Palace, Kyoto, Japan, 17th century

天皇宝座，皇宫，京都，日本，17世纪

Bacardi Office Building,
Santiago de Cuba, 1958,
Mies van der Rohe

巴卡迪办公大楼，圣地亚哥，古巴，1958年，密斯·凡德罗





S. Maria Novella, Florence, 1456–1470.
The Renaissance facade by Alberti presents a public face to a square.

圣玛丽亚·诺维拉教堂，佛罗伦萨，1456年—1470年
由阿尔伯蒂设计的文艺复兴式的立面，为广场提供了一副公共化的面孔。



Uffizi Palace, 1560–1565, *Giorgio Vasari*.
This Florentine street defined by the two wings of the Uffizi Palace links the Piazza della Signoria with the River Arno.

乌飞齐宫，1560年—1565年，乔治·瓦萨里
佛罗伦萨的这条街道是由乌飞齐宫的两翼限定的，把席格诺利亚广场和阿尔诺河联系在一起。

Exterior wall planes isolate a portion of space to create a controlled interior environment. Their construction provides both privacy and protection from the climatic elements for the interior spaces of a building, while openings within or between their boundaries reestablish a connection with the exterior environment. As exterior walls mold interior space, they simultaneously shape exterior space and describe the form, massing, and image of a building in space.

外墙面隔离了空间的一部分，目的是创造可控的室内环境。它们的构造既为建筑的室内空间提供了私密性，又使其免受气候因素的影响。同时，边界以内或边界之间的洞口，重新建立了与室外环境的联系。由于外墙塑造了室内空间，这些外墙同时也塑造了外部空间，并描绘出空间中一座建筑物的形式、体量和留给人们的印象。

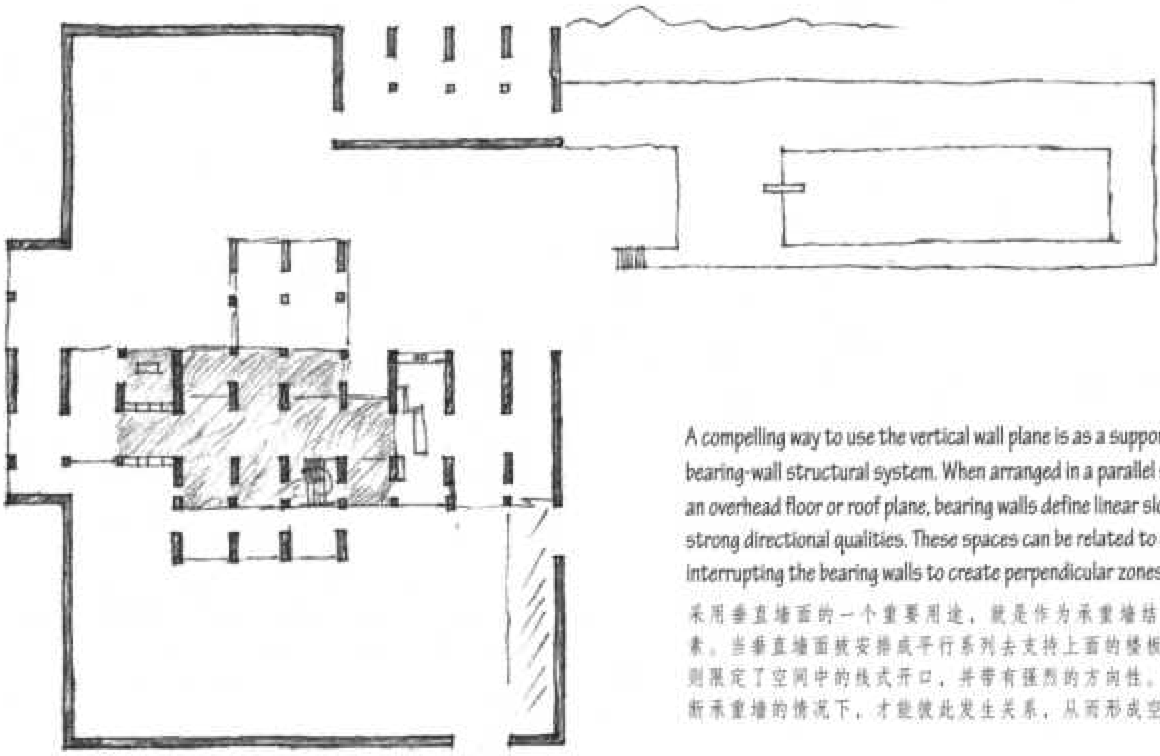
As a design element, the plane of an exterior wall can be articulated as the front or primary facade of a building. In urban situations, these facades serve as walls that define courtyards, streets, and such public gathering places as squares and marketplaces.

作为一个设计要素，室外墙面可以很明确地看作是建筑物的正面或主要立面。在城市环境中，这些立面作为墙体，限定出庭院、街道以及诸如广场和市场这类公共聚集场所。



Piazza of San Marco, Venice.
The continuous facades of buildings form the "walls" of the urban space.

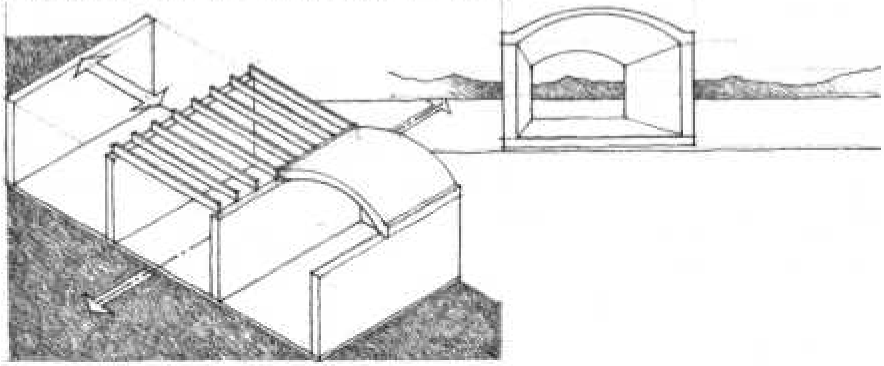
圣马可广场，威尼斯
建筑物连续的立面形成了城市空间的"墙"。



A compelling way to use the vertical wall plane is as a supporting element in the bearing-wall structural system. When arranged in a parallel series to support an overhead floor or roof plane, bearing walls define linear slots of space with strong directional qualities. These spaces can be related to one another only by interrupting the bearing walls to create perpendicular zones of space.

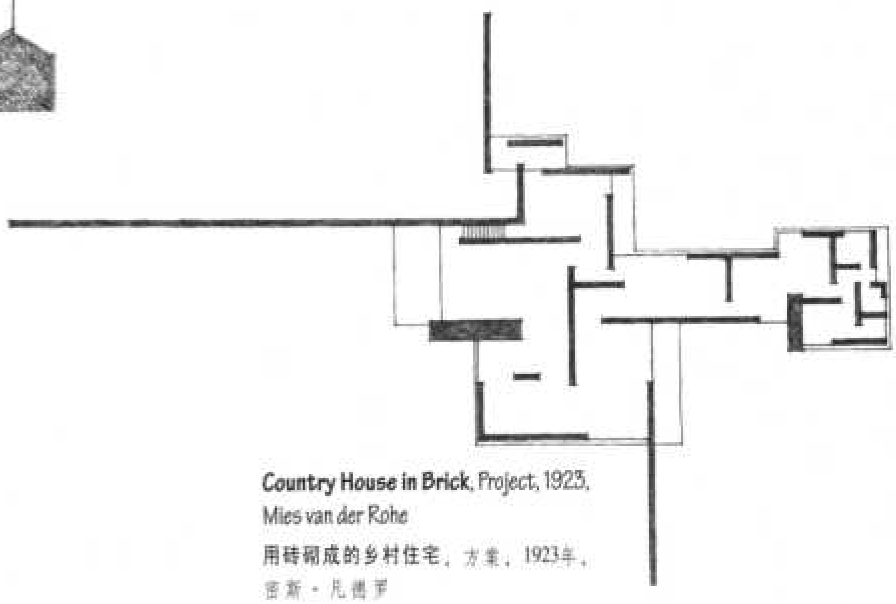
采用垂直墙面的一个重要用途，就是作为承重墙结构体系中的支撑要素。当垂直墙面被安排成平行系列去支持上面的楼板或屋面时，承重墙则限定了空间中的线式开口，并带有强烈的方向性。这些空间唯有在打断承重墙的情况下，才能彼此发生关系，从而形成空间中的贯穿区域。

Peyrissac Residence, Cherchell, North Africa, 1942, Le Corbusier
佩里萨克住宅，舍尔舍勒，北非，1942年，勒·柯布西埃

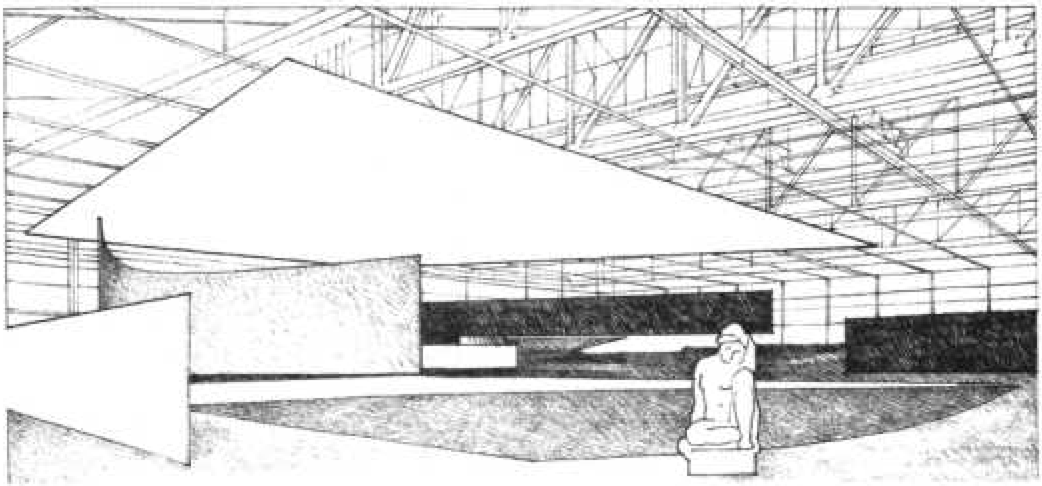


In the project to the right, freestanding brick bearing walls, together with L-shaped and T-shaped configurations of planes, create an interlocking series of spaces.

在右图所示的方案中，独立的承重砖墙，与L形和T形墙面布局一起，创造出一种互相穿插的系列空间。



Country House in Brick, Project, 1923, Mies van der Rohe
用砖砌成的乡村住宅，方案，1923年，密斯·凡德罗



Concert Hall, Project, 1942, Mies van der Rohe

音乐厅，方案，1942年，密斯·凡德罗

Interior wall planes govern the size and shape of the internal spaces or rooms within a building. Their visual properties, their relationship to one another, and the size and distribution of openings within their boundaries determine both the quality of the spaces they define and the degree to which adjoining spaces relate to one another.

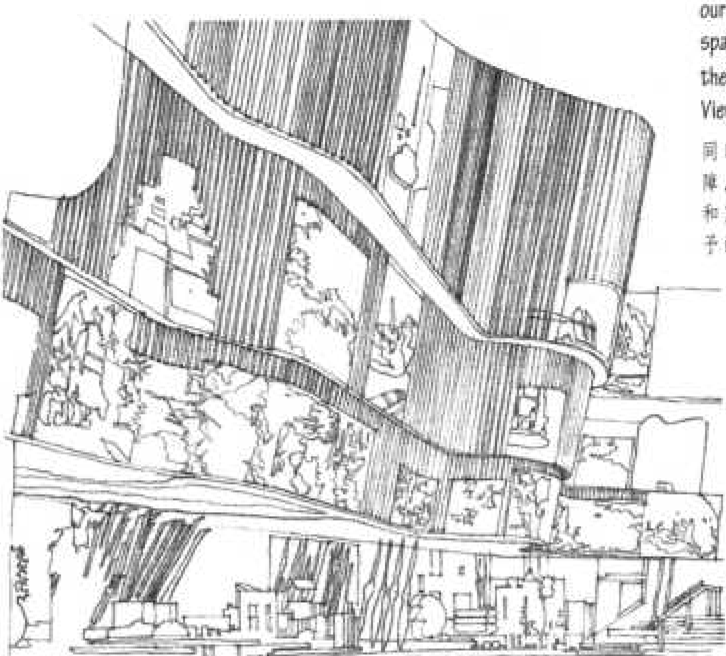
室内墙面控制着建筑物中室内空间或房间的规模与形状。它们的视觉属性、彼此之间的关系，大小以及边界之内洞口的分布，既决定了墙面所限定空间的质量，也决定了相邻空间彼此关联的程度。

As a design element, a wall plane can merge with the floor or ceiling plane, or be articulated as an element isolated from adjacent planes. It can be treated as a passive or receding backdrop for other elements in the space, or it can assert itself as a visually active element within a room by virtue of its form, color, texture, or material.

作为一个设计要素，墙面可以与楼板或顶棚结合在一起，也可以设计成与相邻平面相分离的独立因素。墙面可以被处理成空间中其他要素退后的背景，也可以利用墙面的形式、色彩、质感或材料，突出自己而成为房间中活跃的视觉因素。

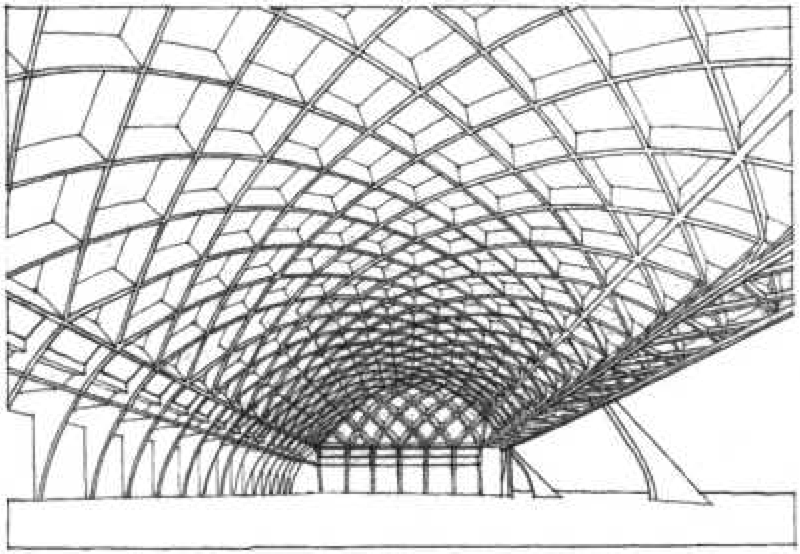
While walls provide privacy for interior spaces and serve as barriers that limit our movement, doorways and windows reestablish continuity with neighboring spaces and allow the passage of light, heat, and sound. As they increase in size, these openings begin to erode the natural sense of enclosure walls provide. Views seen through the openings become part of the spatial experience.

同时，墙体给室内空间提供了私密性并且成为限制我们活动的屏障，而门口和窗户则重新建立起与相邻空间的连续性，并使得光、热和声音从中穿过。随着洞口尺寸的增大，洞口开始侵蚀围合墙体所赋予的自然感受。透过洞口的所见所闻，成为空间感受的一个部分。



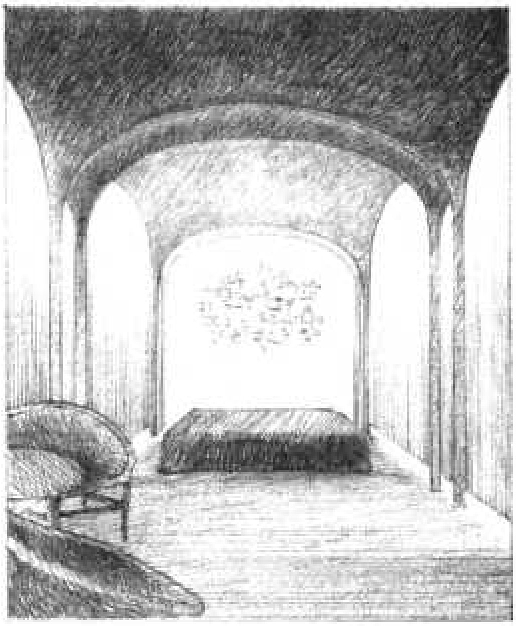
Finnish Pavilion, New York World's Fair, 1939, Alvar Aalto

芬兰馆，纽约世界博览会，1939年，A.阿尔托



Hangar, Design I, 1935, Pier Luigi Nervi.
The lamella structure expresses the way forces are resolved and channeled down to the roof supports.

飞机库，设计1，1935年，P.L.奈尔维
薄壳结构表达出力分解的方式以及力传导至屋顶支撑构件的途径。



Brick House, New Canaan, Connecticut, 1949, Philip Johnson. *The detached vaulted ceiling plane appears to float above the bed.*

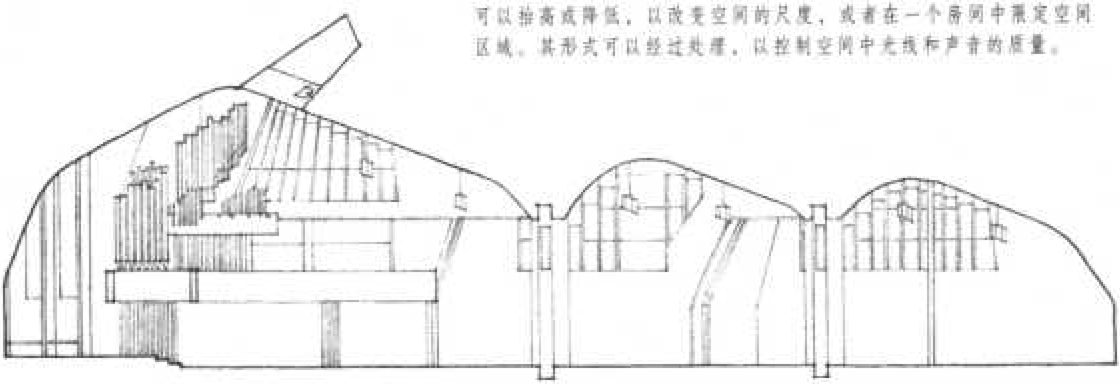
砖住宅，新坎南，康涅狄格州，1949年，P.约翰逊独立的拱顶则好浮在床的上面。

While we walk on a floor and have physical contact with walls, the ceiling plane is usually out of our reach and is almost always a purely visual event in a space. It may be the underside of an overhead floor or roof plane and express the form of its structure as it spans the space between its supports, or it may be suspended as the upper enclosing surface of a room or hall.

当我们在楼板上走动，与墙面有实际的接触时，顶棚通常是我们难以触及的，因此顶棚几乎总是空间中的一个纯视觉因素。它也许是上面楼板的底面或建筑的屋面，当楼板在其支撑构件之上跨越空间时，就表现出其结构形式；它或许悬于空中作为房间或厅堂顶上的围合表面。

As a detached lining, the ceiling plane can symbolize the sky vault or be the primary sheltering element that unifies the different parts of a space. It can serve as a repository for frescoes and other means of artistic expression or be treated simply as a passive or receding surface. It can be raised or lowered to alter the scale of a space or to define spatial zones within a room. Its form can be manipulated to control the quality of light or sound within a space.

作为一个独立的内面，顶棚能够象征苍穹或者最基本的庇护要素，这一要素把空间中的不同部分统一在一起。屋顶可以成为壁画的载体，其他艺术表达的途径，或者只是简单地处理成退后的表面。它可以抬高或降低，以改变空间的尺度，或者在一个房间中限定空间区域。其形式可以经过处理，以控制空间中光线和声音的质量。



Church at Vuoksenniska, Finland, 1956, Alvar Aalto.
The form of the ceiling plane defines a progression of spaces and enhances their acoustical quality.

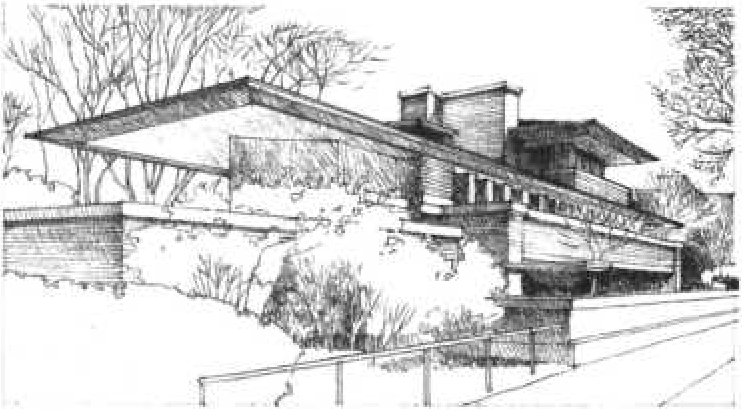
沃克辛尼斯卡教堂，芬兰，1956年，A.阿尔托
顶棚的形式决定了一个空间系列并提高了空间的声学性能。

The roof plane is the essential sheltering element that protects the interior of a building from the climatic elements. The form and geometry of its structure is established by the manner in which it spans across space to bear on its supports and slopes to shed rain and melting snow. As a design element, the roof plane is significant because of the impact it can have on the form and silhouette of a building within its setting.

屋面是保护建筑室内不受气候因素影响的基本要素。其结构的形式和几何形状，决定于屋面跨越空间的方式，与屋面的支撑结构以及避雨融雪的坡度有关。作为一个设计要素，屋面非常重要，因为在建筑所处的环境中，屋面对于建筑的形式和轮廓具有影响。

Dolmen, a prehistoric monument consisting of two or more large upright stones supporting a horizontal stone slab, found especially in Britain and France and usually regarded as a burial place for an important person.

巨石墓，这是一座史前的纪念碑，由两块或几块竖直向上的巨石支撑着一块横向的石板构成，主要发现于英国和法国，通常被认为是重要人物的墓地。



Robie House, Chicago,1909, Frank Lloyd Wright.
The low sloping roof planes and broad overhangs are characteristic of the Prairie School of Architecture.

罗比住宅，芝加哥，1909年，F. L. 莱特
低矮的坡屋面和宽阔的出檐，是草原派建筑的特征。

The roof plane can be hidden from view by the exterior walls of a building or merge with the walls to emphasize the volume of the building mass. It can be expressed as a single sheltering form that encompasses a variety of spaces beneath its canopy, or comprise a number of hats that articulate a series of spaces within a single building.

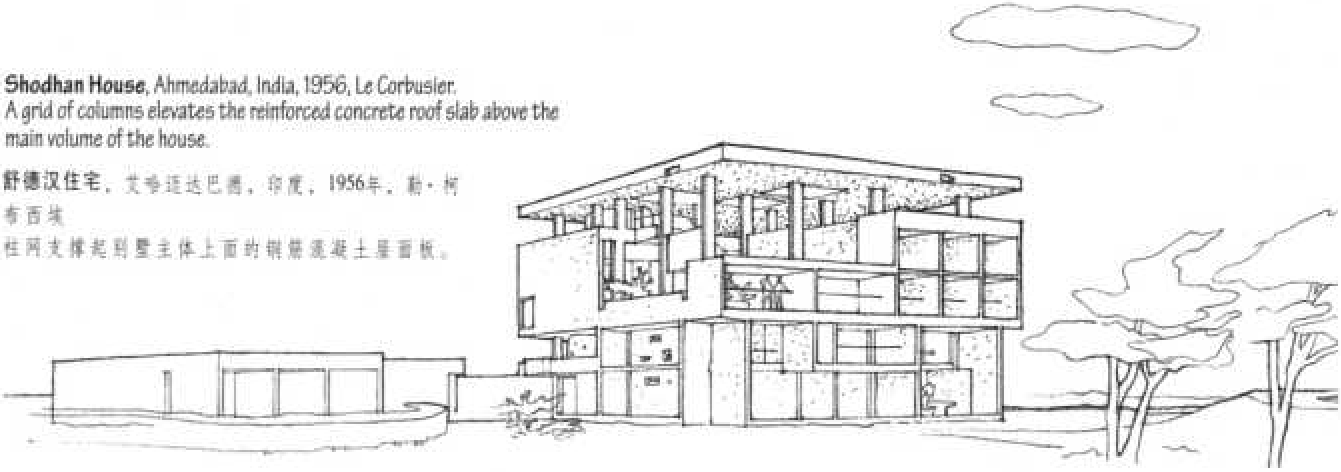
可以用建筑物的外墙把屋面隐藏在视野之外，或者把屋面与墙面融为一体以强调建筑体量的容积。屋面可以被表达为一个独立的遮风避雨的形式，在其顶棚之下包容着多样空间；或者在一栋建筑物中，由很多“帽子”组成，从而形成空间系列。

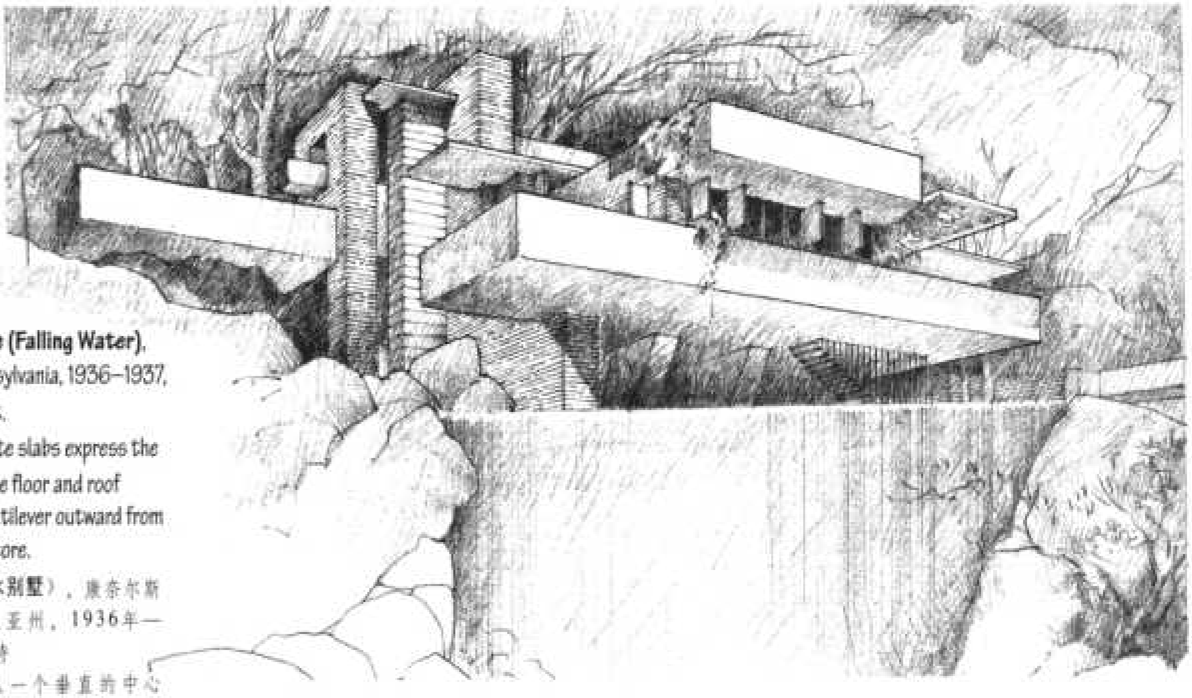
A roof plane can extend outward to form overhangs that shield door and window openings from sun or rain, or continue downward further still to relate itself more closely to the ground plane. In warm climates, it can be elevated to allow cooling breezes to flow across and through the interior spaces of a building.

屋面可以向外伸展，形成雨篷，保护门和窗洞免受日晒雨淋，或者继续向下伸展，与地平面更紧密地联系。在气候炎热的地区，屋面可以抬高，让凉爽的微风吹进来，同时穿过建筑物的室内空间。

Shodhan House, Ahmedabad, India, 1956, Le Corbusier.
A grid of columns elevates the reinforced concrete roof slab above the main volume of the house.

舒德汉住宅，艾哈迈达巴德，印度，1956年，勒·柯布西埃
柱网支撑起别墅主体上面的钢筋混凝土屋面板。





Kaufmann House (Falling Water), *Connellsville, Pennsylvania, 1936–1937,* Frank Lloyd Wright.
Reinforced concrete slabs express the horizontality of the floor and roof planes as they cantilever outward from a central vertical core.

考夫曼住宅（流水别墅），康奈尔斯维尔，宾夕法尼亚州，1936年—1937年，F. L. 莱特
当楼板和屋面从一个垂直的中心核向外悬挑的时候，钢筋混凝土板生动地表现出这些构件的水平特征。

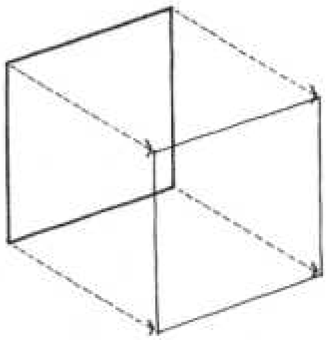
The overall form of a building can be endowed with a distinctly planar quality by carefully introducing openings which expose the edges of vertical and horizontal planes. These planes can be further differentiated and accentuated by changes in color, texture, or material.

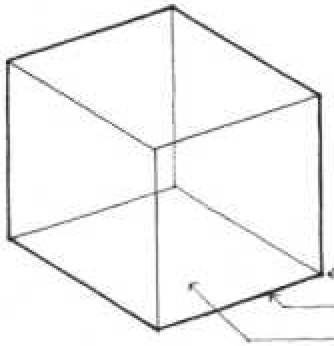
通过精心地安排洞口位置，并且透过洞口能够看到垂直或水平面的边缘，一座建筑的总体形式就可以被赋予独特的二度特征。这些面可以通过色彩、质感或材料的变化而被进一步区别或强调。



Schröder House, Utrecht, 1924–1925, *Gerrit Thomas Rietveld.*
Asymmetrical compositions of simple rectangular forms and primary colors characterized the de Stijl school of art and architecture.

施洛德住宅，乌得勒支，1924年—1925年，G. T. 里特维尔德
简约的矩形、不对称构图形式和红黄蓝三原色，表现出艺术与建筑领域的风格派特征。





A plane extended in a direction other than its intrinsic direction becomes a volume. Conceptually, a volume has three dimensions: length, width, and depth.

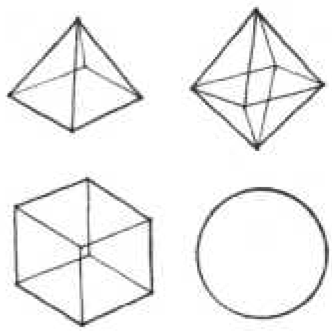
一个面沿着非自身方向延伸就变成体。从概念上讲，一个体具有三个量度：长度、宽度和深度。

All volumes can be analyzed and understood to consist of:

- points or vertices where several planes come together
- lines or edges where two planes meet
- planes or surfaces which define the limits or boundaries of a volume

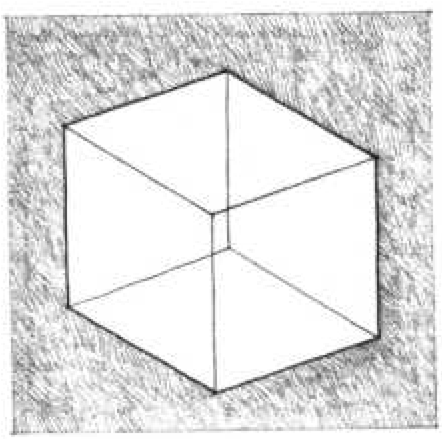
所有的体可以被分析和理解为由以下部分所组成：

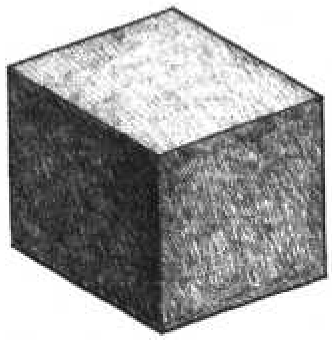
- 点或顶点，几个面在此相交
- 线或边界，两面在此相交
- 面或表面，限定体的界限



Form is the primary identifying characteristic of a volume. It is established by the shapes and interrelationships of the planes that describe the boundaries of the volume.

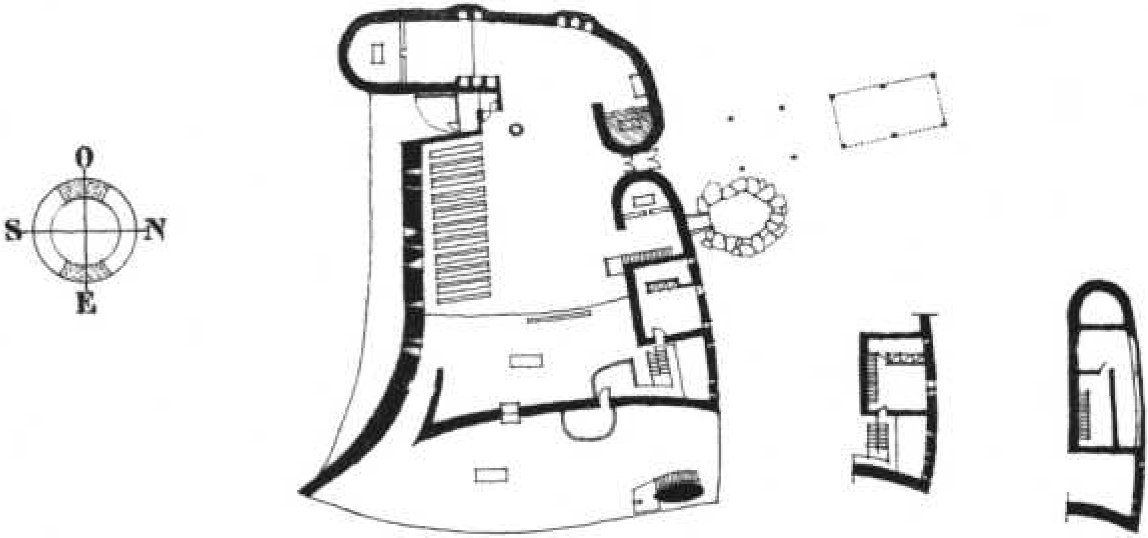
形式是体所具有的基本的、可以识别的特征。它是由面的形状和面之间的相互关系所决定的，这些面表示出体的界限。





As the three-dimensional element in the vocabulary of architectural design, a volume can be either a solid—space displaced by mass—or a void—space contained or enclosed by planes.

作为建筑设计语汇中的三度要素，体既可以是实体，即用体量替代空间；也可以是虚空，即由面所包容或围合的空间。



Plan and Section

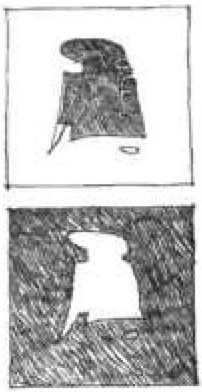
Space defined by wall, floor, and ceiling or roof planes

平面与剖面

由墙面、地板和顶棚或屋面决定的空间

In architecture, a volume can be seen to be either a portion of space contained and defined by wall, floor, and ceiling or roof planes, or a quantity of space displaced by the mass of a building. It is important to perceive this duality, especially when reading orthographic plans, elevations, and sections.

在建筑中，容积或者可以被看作是空间的一部分，由墙体、地板、顶棚或屋面组成和限定，也可以看成是一些空间被建筑体量所取代。意识到这种二元性是很重要的，特别是在阅读正统的平面、立面和剖面的时候。

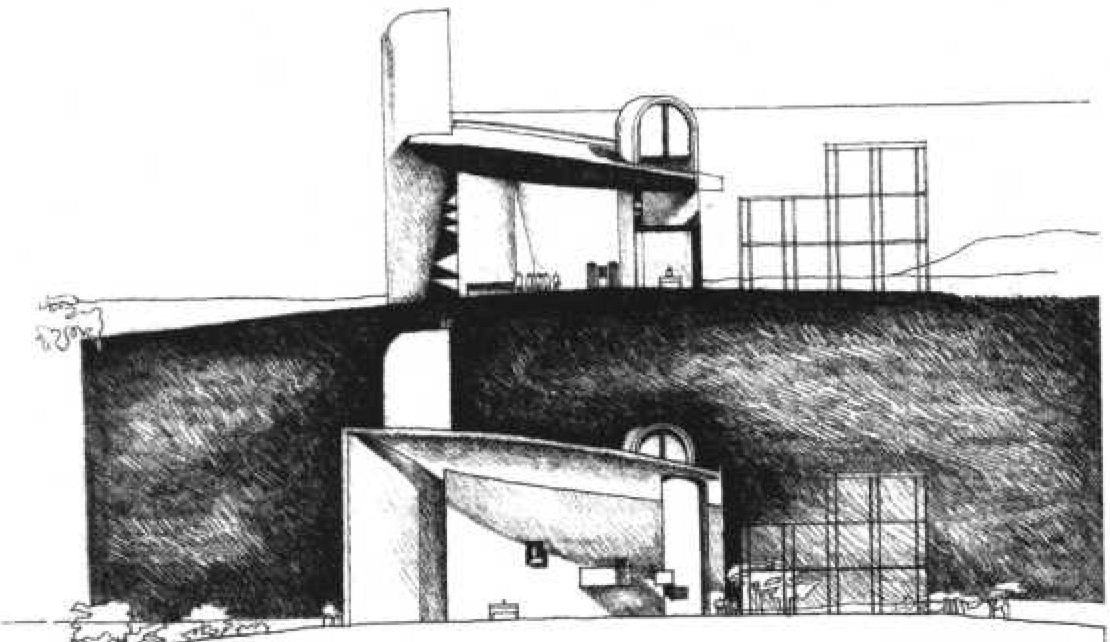


Elevation

Space displaced by the mass of a building

立面

被建筑体量所取代了的空间

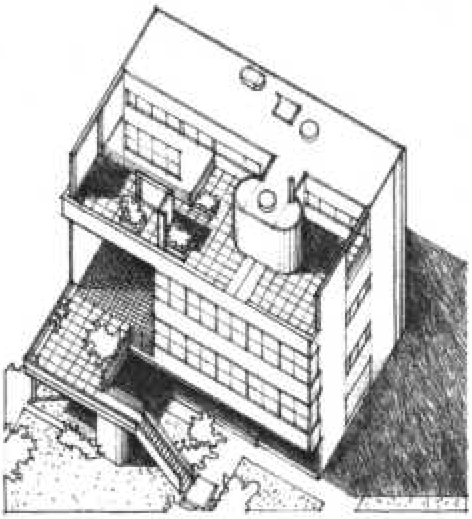


Notre Dame Du Haut, Ronchamp, France, 1950–1955, Le Corbusier

圣母教堂，朗香，法国，1950年—1955年，勒·柯布西埃

Building forms that stand as objects in the landscape can be read as occupying volumes in space.

作为实物耸立于地景中的建筑形式，可以解读为占据空间中的容积。

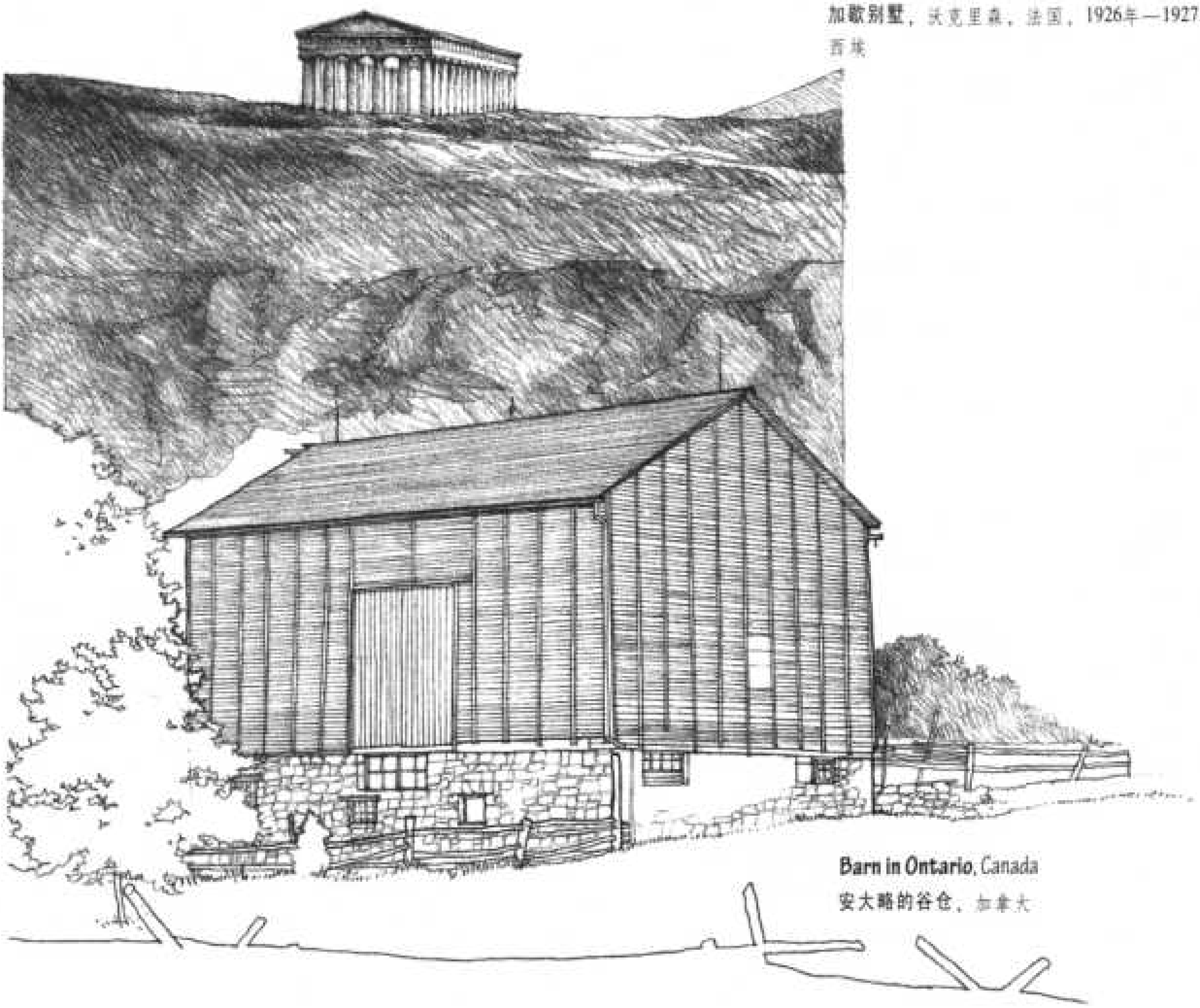


Villa Garches, Vaucresson, France, 1926–1927, Le Corbusier

加歇别墅，沃克里森，法国，1926年—1927年，勒·柯布西埃

Doric Temple at Segesta, Sicily, c. 424–416 B.C.

西格斯塔的陶立克神庙，西西里，公元前424年—公元前416年



Barn in Ontario, Canada

安大略的谷仓，加拿大

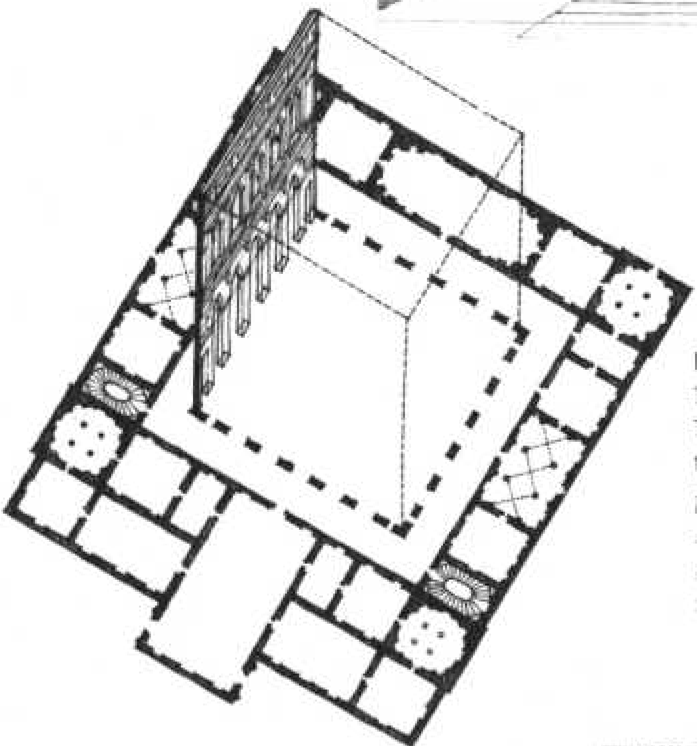
Building forms that serve as containers can be read as masses that define volumes of space.

作为容器的建筑形式，可以解读为限定了空间容积的体量。



Piazza Maggiore, Sabbioneta, Italy.
A series of buildings enclose an urban square.

马焦雷广场，萨布比涅塔，意大利
一系列建筑围合成一片城市广场。

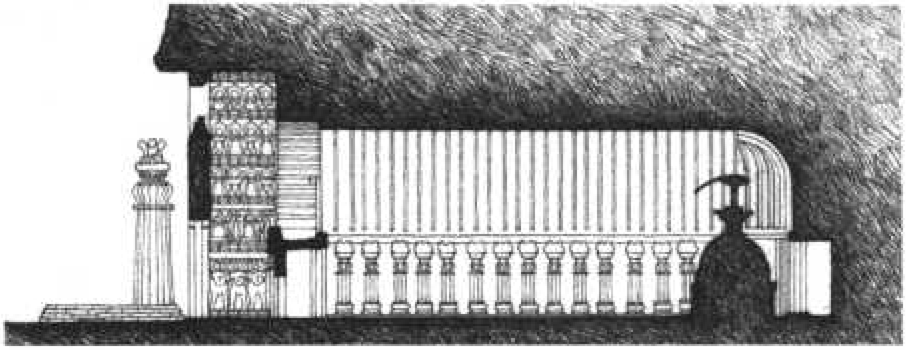


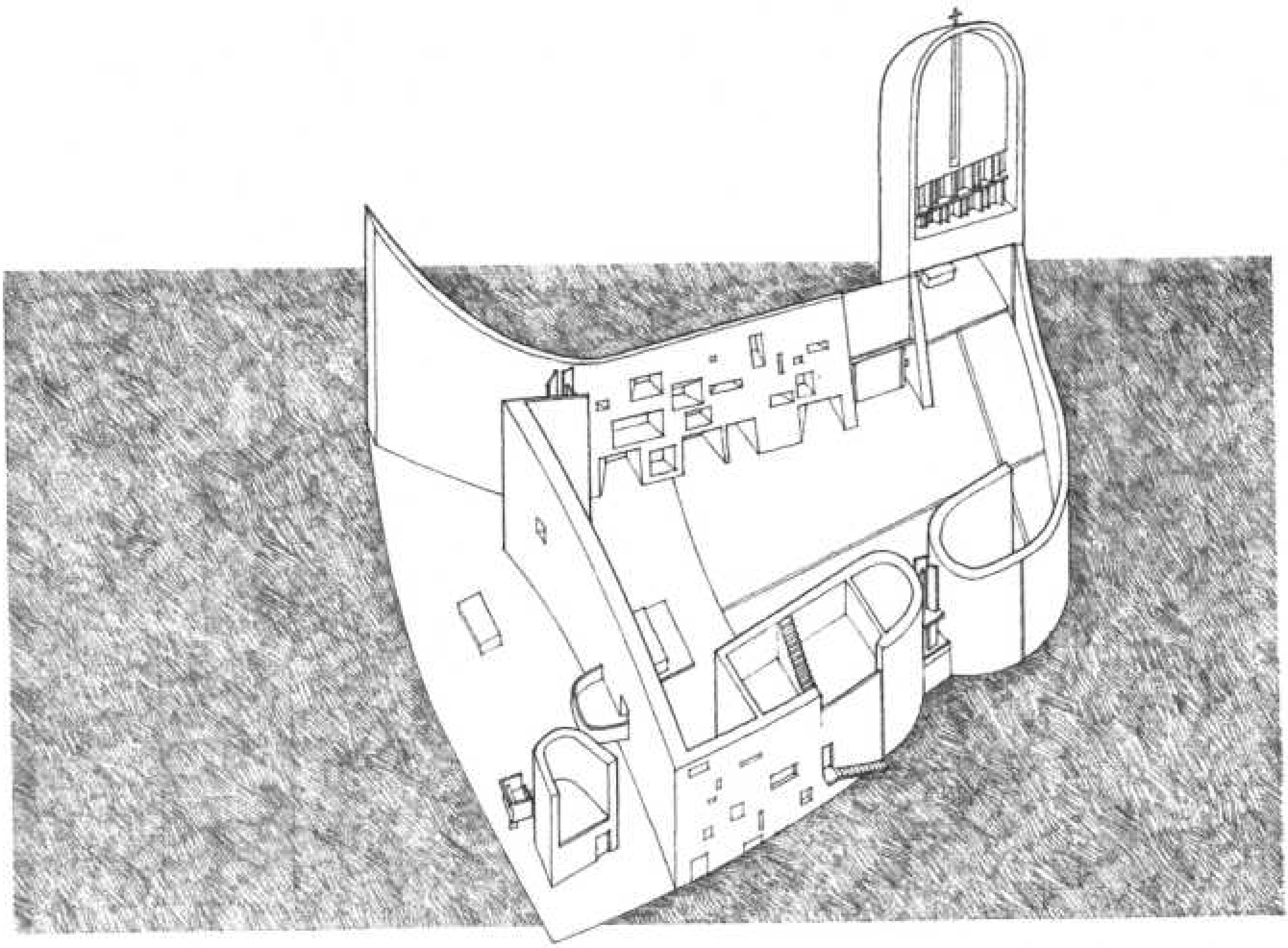
Palazzo Thiene, Vicenza, Italy,
1545, Andrea Palladio.
The interior rooms surround a cortile—the principal courtyard of an Italian palazzo.

席恩尼宫殿，威尼斯，意大利，1545年，A. 帕拉蒂奥
建筑内部的房间围绕着一个中庭——意大利宫殿的重要庭院。

Buddhist Chaitya Hall at Karli,
Maharashtra, India, A.D. 100–125.
The sanctuary is a volume of space carved out of the mass of solid rock.

卡尔利的佛寺大厅，马哈拉施特拉，印度，100年—125年
该寺庙是从坚固的岩石体量中凿出的空间容积。





2 形式
Form

"Architectural form is the point of contact between mass and space . . . Architectural forms, textures, materials, modulation of light and shade, color, all combine to inject a quality or spirit that articulates space. The quality of the architecture will be determined by the skill of the designer in using and relating these elements, both in the interior spaces and in the spaces around buildings."

Edmund N. Bacon
The Design of Cities
1974

"建筑形式是体量与空间的联系点……建筑形式、质感、材料、光与影的调节、色彩，所有要素汇集在一起，就能够表达空间的品质或精神。建筑的品质决定于设计者运用和综合处理这些要素的能力，室内空间和建筑外部空间都是如此。"

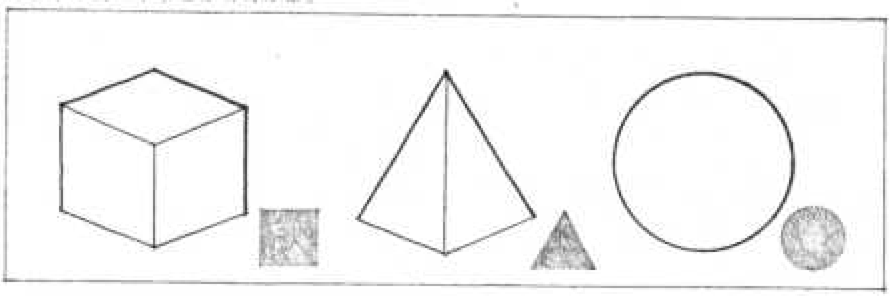
E. N. 培根
《城市设计》
1974年

Form is an inclusive term that has several meanings. It may refer to an external appearance that can be recognized, as that of a chair or the human body that sits in it. It may also allude to a particular condition in which something acts or manifests itself, as when we speak of water in the form of ice or steam. In art and design, we often use the term to denote the formal structure of a work—the manner of arranging and coordinating the elements and parts of a composition so as to produce a coherent image.

形式是一个综合性的词语，具有多种含义。它可以指能够辨认的外观，比如一把椅子或者坐在椅子里的人体。它也可以指某物担当的角色或展示自身的一种特定状态，正如我们谈到水能够呈现出冰或者蒸汽的形态。在艺术和设计中，我们常用这个词来表示一件作品的外形结构，即排列和协调某一整体中的各要素或各组成部分的手法，其目的在于形成一个条理分明的形象。

In the context of this study, form suggests reference to both internal structure and external outline and the principle that gives unity to the whole. While form often includes a sense of three-dimensional mass or volume, shape refers more specifically to the essential aspect of form that governs its appearance—the configuration or relative disposition of the lines or contours that delimit a figure or form.

在本项研究的脉络中，形式的含义是内部结构与外部轮廓以及整体结合在一起的原则。形式通常是指三度的体量或容积的意思，而形状则更加明确地指控制其外观的基本面貌，即布局或线条的相关排列方式以及勾画一个图像或形式的轮廓。

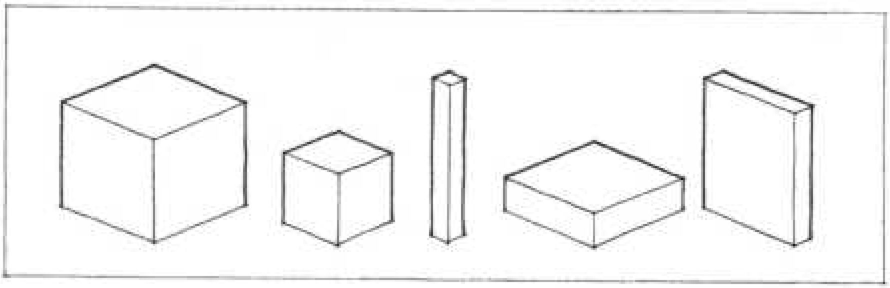


Shape The characteristic outline or surface configuration of a particular form. Shape is the principal aspect by which we identify and categorize forms.

形状 形状即某一特定形式的独特造型或表面轮廓。形状是我们识别形式、给形式分类的主要依据。

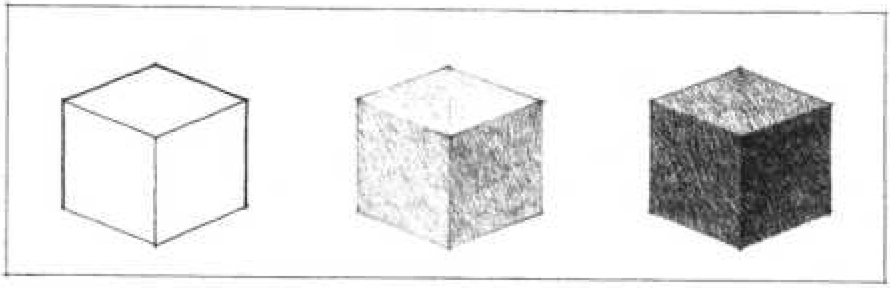
In addition to shape, forms have visual properties of:

除了形状，形式具有如下视觉特征：



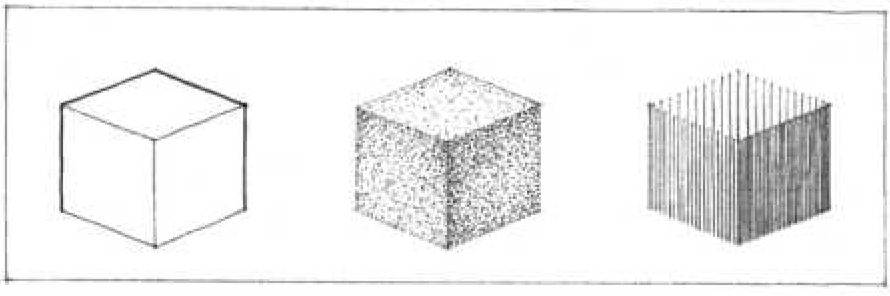
Size The physical dimensions of length, width, and depth of a form. While these dimensions determine the proportions of a form, its scale is determined by its size relative to other forms in its context.

尺寸 尺寸是某一形式长、宽、深的实际量度。这些量度确定形式的比例。尺度则是由它的尺寸与周围其他形式的关系所决定的。



Color A phenomenon of light and visual perception that may be described in terms of an individual's perception of hue, saturation, and tonal value. Color is the attribute that most clearly distinguishes a form from its environment. It also affects the visual weight of a form.

色彩 色彩是光与视知觉引发的一种现象，可以根据每个人对于色彩的知觉、颜色深浅和色调值的感觉来描述。色彩是使形式区别于其环境的最明显的属性。它也影响着形式的视觉重量。



Texture The visual and especially tactile quality given to a surface by the size, shape, arrangement, and proportions of the parts. Texture also determines the degree to which the surfaces of a form reflect or absorb incident light.

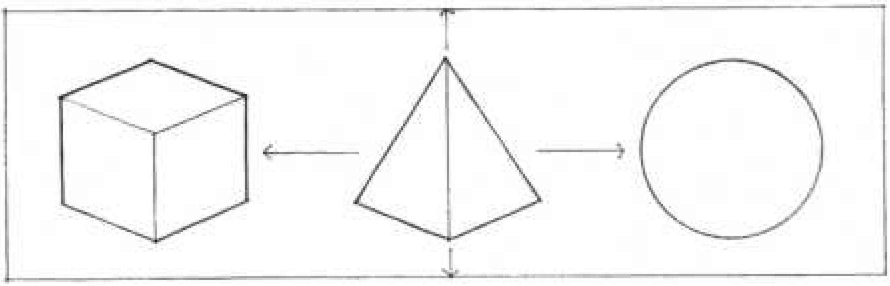
质感 质感即通过部件的尺寸、形状、布局和比例而赋予某一表面的视觉以及特殊的触觉特性。质感也决定着某一形式的各个表面反射或吸收照射光线的程度。

Forms also have relational properties which govern the pattern and composition of elements:

形式还具有一些相关属性，这些属性控制着要素的图案和构图：

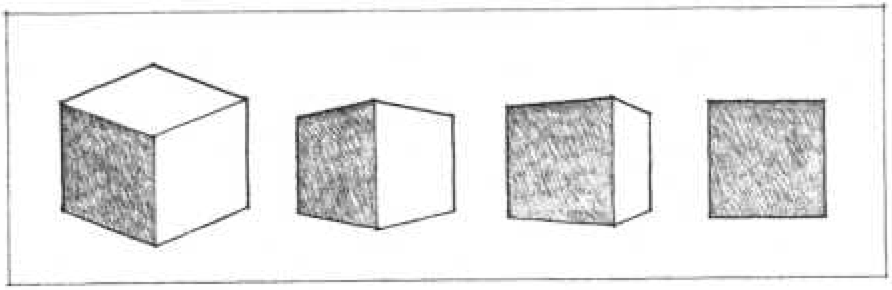
Position The location of a form relative to its environment or the visual field within which it is seen.

位 置 是指与形式所处的环境或者用来观察形式的视域相关的特定地点。



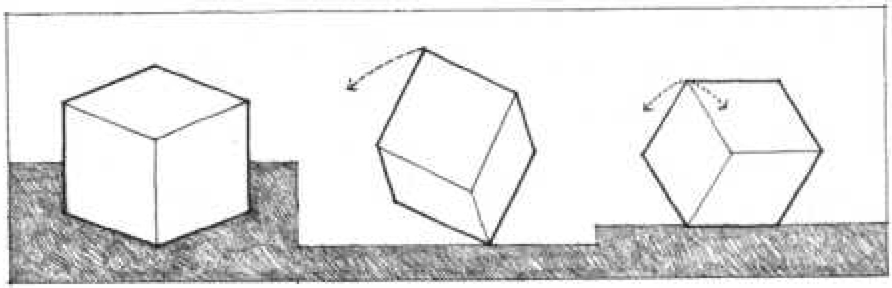
Orientation The direction of a form relative to the ground plane, the compass points, other forms, or to the person viewing the form.

方 位 是指某一形式的方向，与地面，指北针的方向，其他形式以及人观看形式的地位有关。



Visual Inertia The degree of concentration and stability of a form. The visual inertia of a form depends on its geometry as well as its orientation relative to the ground plane, the pull of gravity, and our line of sight.

视觉惯性 是指一个形式的集中程度和稳定程度。形式的视觉惯性，取决于几何性以及与地面、重力和我们的视线相关的方向。

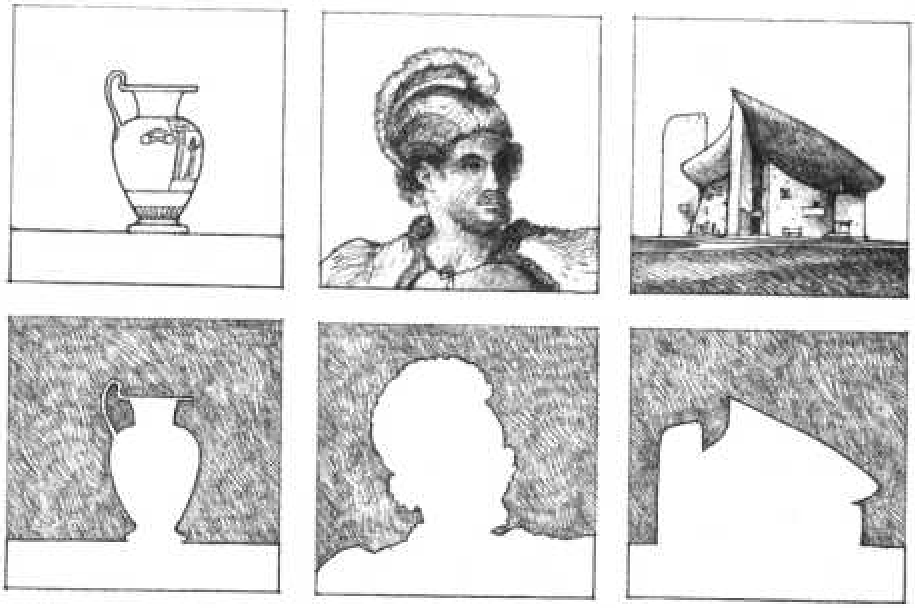


All of these properties of form are in reality affected by the conditions under which we view them.

- A changing perspective or angle of view presents different shapes or aspects of a form to our eyes.
- Our distance from a form determines its apparent size.
- The lighting conditions under which we view a form affects the clarity of its shape and structure.
- The visual field surrounding a form influences our ability to read and identify it.

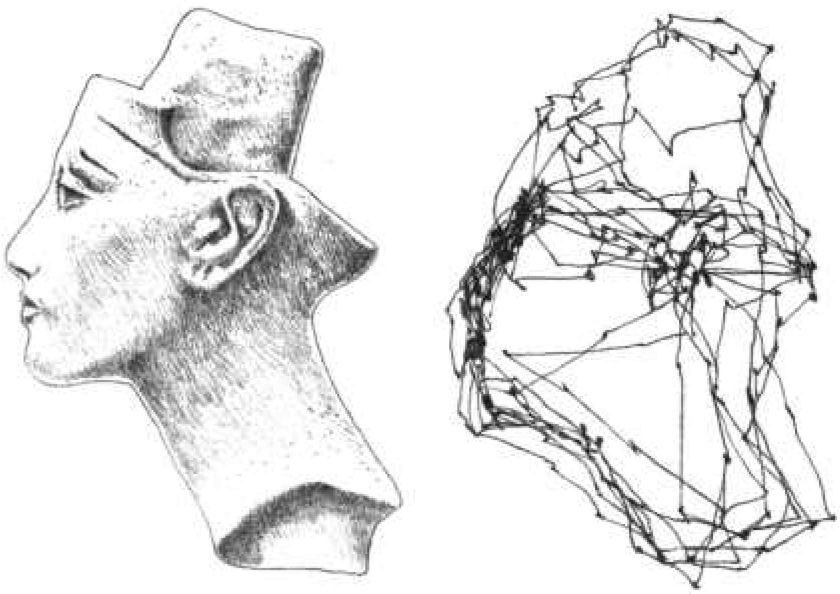
所有这些形式的属性，实际上都受到我们观察形式时所处条件的影响。

- 变化的视点或视角给我们的眼睛提供了形式的不同形状或面貌。
- 我们与某一形式之间的距离，决定了它看上去的大小。
- 我们观察某一形式时的光线条件，影响着其形状和结构的清晰度。
- 某一形式周围的视野，影响着我们解读或识别形式的能力。



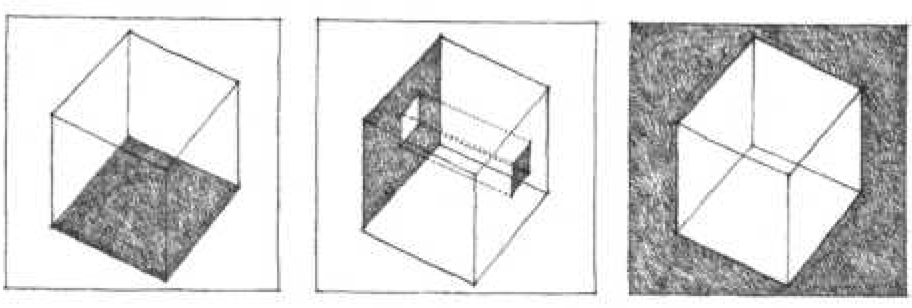
Shape refers to the characteristic outline of a plane figure or the surface configuration of a volumetric form. It is the primary means by which we recognize, identify, and categorize particular figures and forms. Our perception of shape depends on the degree of visual contrast that exists along the contour separating a figure from its ground or between a form and its field.

形状是指一个面的典型轮廓线或一个体的表面轮廓。它是我们认知、识别以及为特殊轮廓或形式分类的基本手段。若形式与这一形式存在的领域之间存在一条轮廓线，便把一个形体从其背景中分离出来。因此我们对于形状的感知取决于形式与其背景之间视觉对比的程度。



Bust of Queen Nefertiti
The pattern of eye movement of a person viewing the figure, from research by Alfred L. Yarbus of the Institute for Problems of Information Transmission in Moscow.

内弗蒂蒂女王头像
某人观看头像时眼睛移动的图案，来自莫斯科信息传播问题研究所的A. L. 亚布斯所做的研究。



In architecture, we are concerned with the shapes of:

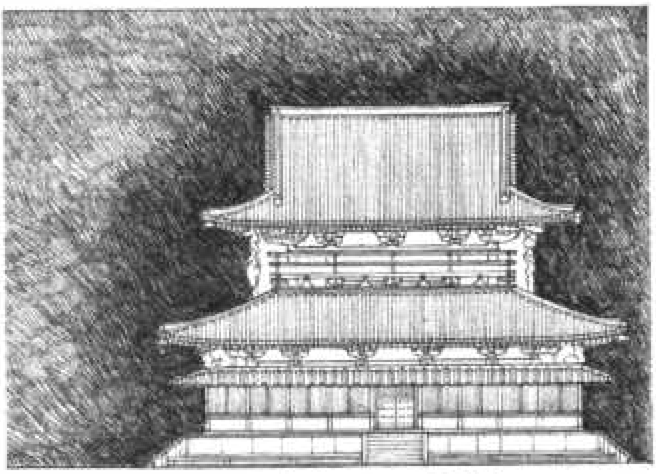
- floor, wall, and ceiling planes that enclose space
- door and window openings within a spatial enclosure
- silhouettes and contours of building forms

在建筑中，我们所涉及的形状有：

- 围合空间的楼面、墙面和顶棚
- 空间围合物上的门窗开洞
- 建筑形式的外轮廓

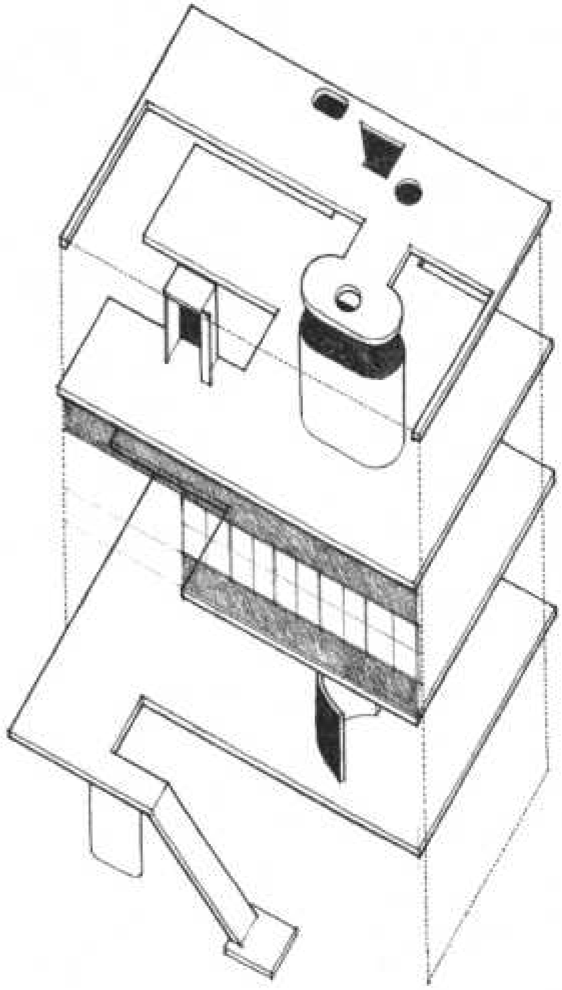
These examples illustrate how shaping the juncture between mass and space expresses the manner in which the contours of a building mass rise from the ground plane and meet the sky.

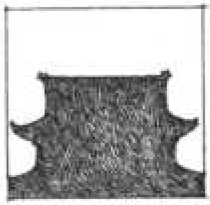
这些实例表明在体量与空间之间如何形成过渡，表现出建筑体量的轮廓线从地面升起并通向天空的方式。



Central Pavilion, Horyu-Ji Temple, Nara, Japan, A.D. 607

中亭，法隆寺，奈良，日本，607年



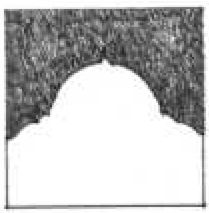


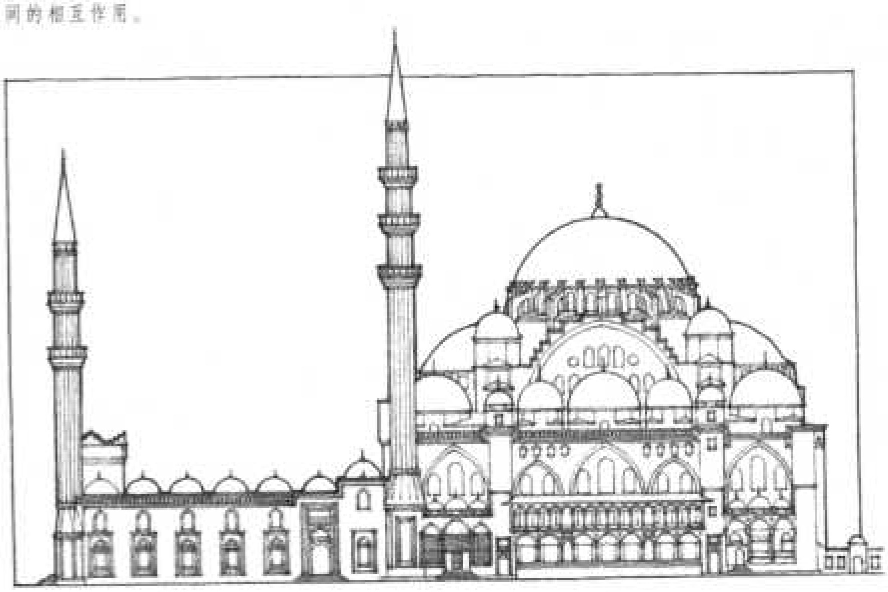
Villa Garches, Vaucresson, France, 1926–1927, Le Corbusier.

This architectural composition illustrates the interplay between the shapes of planar solids and voids.

加歇别墅，沃克里森，法国，1926年—1927年，勒·柯布西埃

这一建筑构图表明，两度的实与虚形状之间的相互作用。



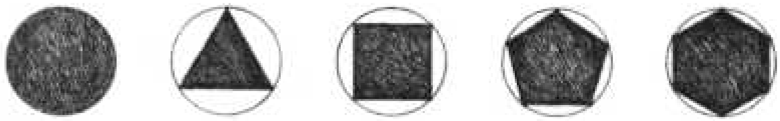


Suleymaniye Mosque,
Constantinople (Istanbul), 1551–1558, Sinan

苏列曼清真寺，君士坦丁堡（伊斯坦布尔），1551年—1558年，辛南

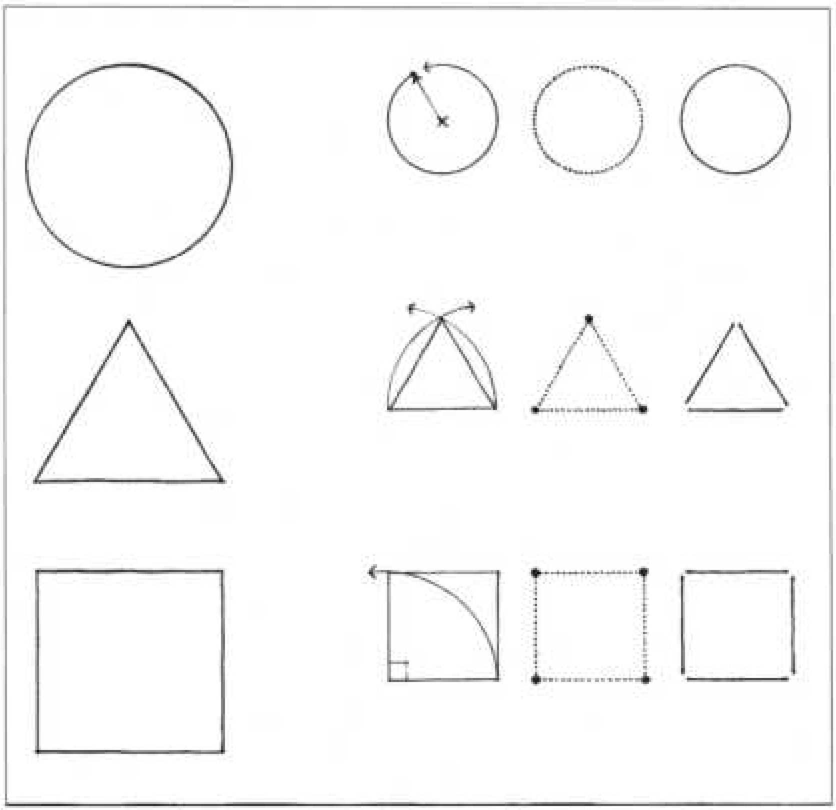
Gestalt psychology affirms that the mind will simplify the visual environment in order to understand it. Given any composition of forms, we tend to reduce the subject matter in our visual field to the simplest and most regular shapes. The simpler and more regular a shape is, the easier it is to perceive and understand.

格式塔心理学指出，为了理解特定的视觉环境，大脑会对其进行简化。至于形式的构图，我们倾向于将视野中的主题进行最大程度的简化，并简化为最基本的形状。一个形状越简单、越规则，它就越容易使人感知和理解。



From geometry we know the regular shapes to be the circle, and the infinite series of regular polygons that can be inscribed within it. Of these, the most significant are the primary shapes: the circle, the triangle, and the square.

我们从几何学里知道，基本的形状是圆形，以及可以内接于圆形的无限系列正多边形。在这些形式中，最重要的是以下基本形状：圆形、三角形和正方形。



Circle A plane curve every point of which is equidistant from a fixed point within the curve.

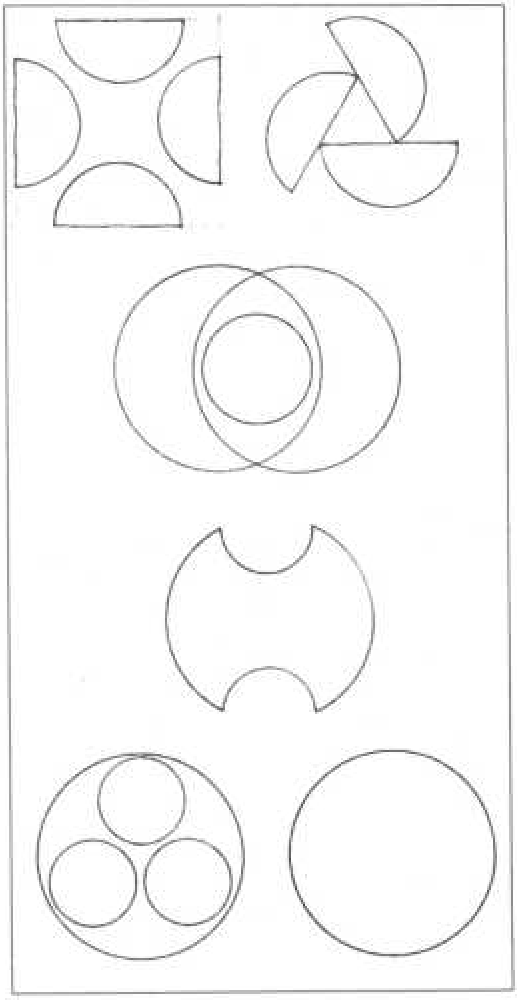
圆形 一个平面曲线图形每点弯曲，且图形上每一点到固定点的距离都相等。

Triangle A plane figure bounded by three sides and having three angles.

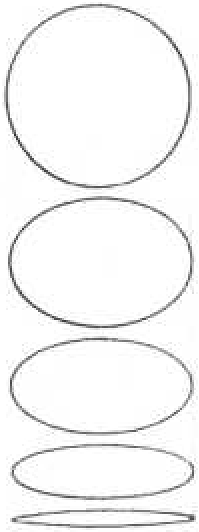
三角形 由三条边限定的平面图形，有三个角。

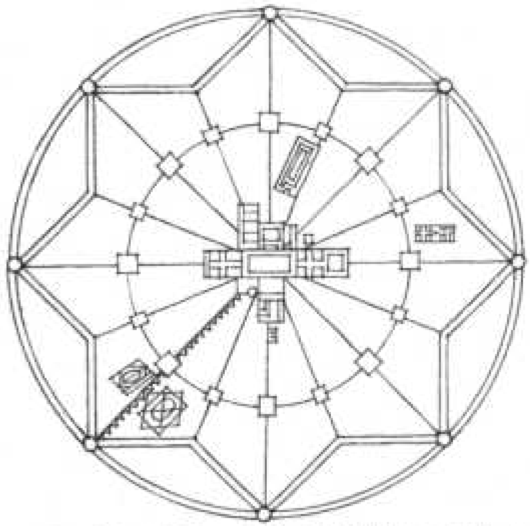
Square A plane figure having four equal sides and four right angles.

正方形 由四条相等的边和四个直角组成的平面图形。

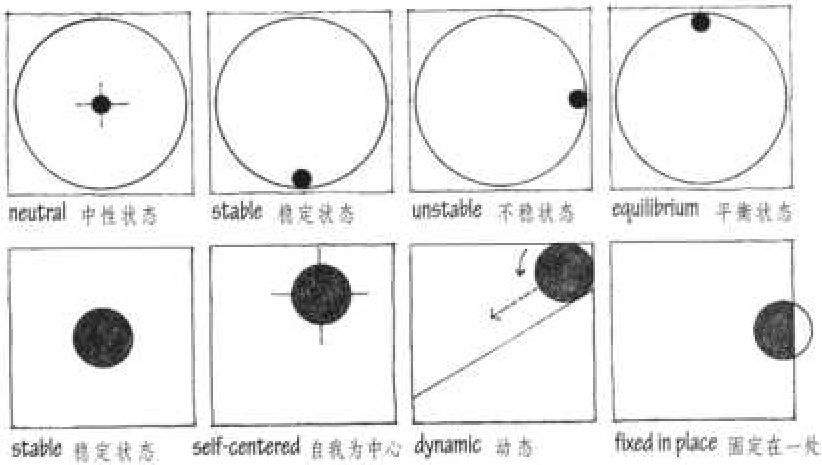


Compositions of circles and circular segments
用圆或圆的局部所组成的构图



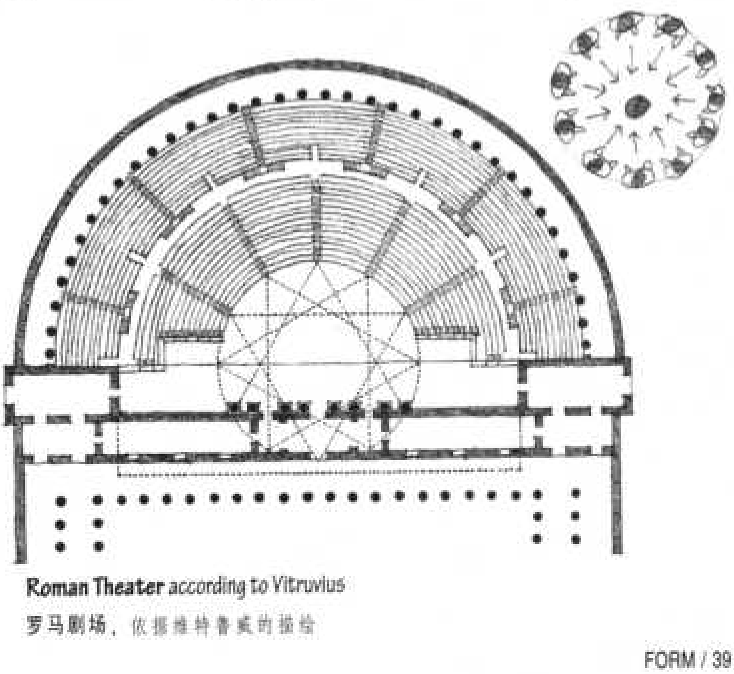


Plan of the Ideal City of Sforzinda, 1464, Antonio Filarete
斯佛真达理想城市平面，1464年，A. 费拉特

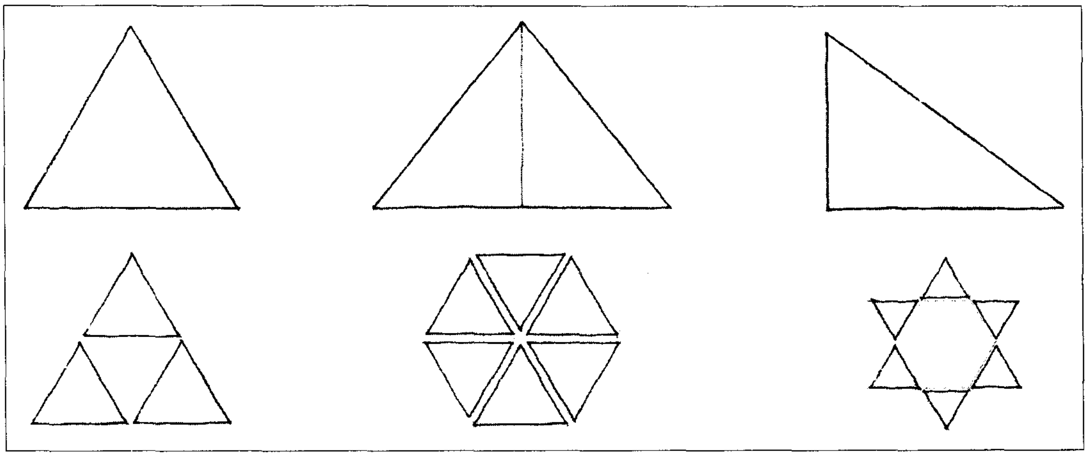


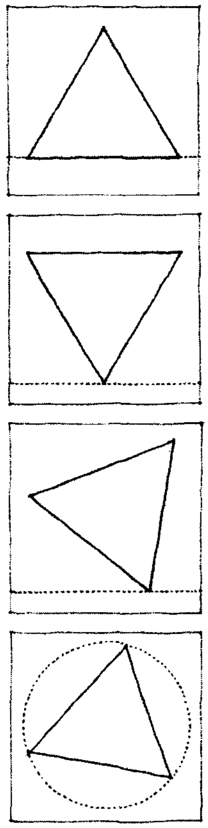
The circle is a centralized, introverted figure that is normally stable and self-centering in its environment. Placing a circle in the center of a field reinforces its inherent centrality. Associating it with straight or angular forms or placing an element along its circumference, however, can induce in the circle an apparent rotary motion.

圆形是一个集中性的、内向性的形状，在它所处的环境中，通常是稳定的、以自我为中心的。把一个圆放在一个场所的中心，将增强其内在的向心性。把圆形与笔直的或成角的形式结合起来，或者沿圆周设置一个要素，就可以在其中引起一种明显的旋转运动感。



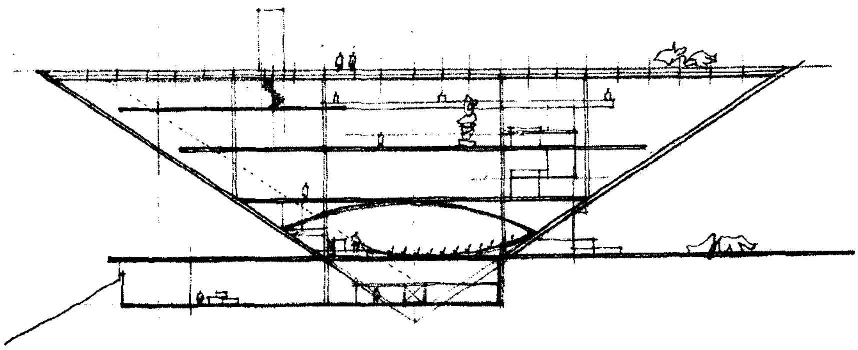
Roman Theater according to Vitruvius
罗马剧场，依据维特鲁威的描绘





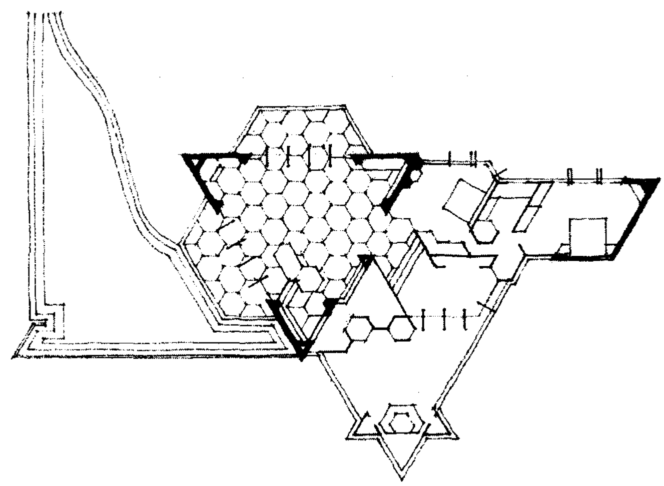
The triangle signifies stability. When resting on one of its sides, the triangle is an extremely stable figure. When tipped to stand on one of its vertices, however, it can either be balanced in a precarious state of equilibrium or be unstable and tend to fall over onto one of its sides.

三角形意味着稳定性。当三角形坐落在它的一条边上时，三角形是一个极其稳定的图形。然而，当三角形以其中一个顶点为支撑点的时候，三角形或者处于不稳定的平衡状态，或者处于不稳定状态而倾向于往一边倒。



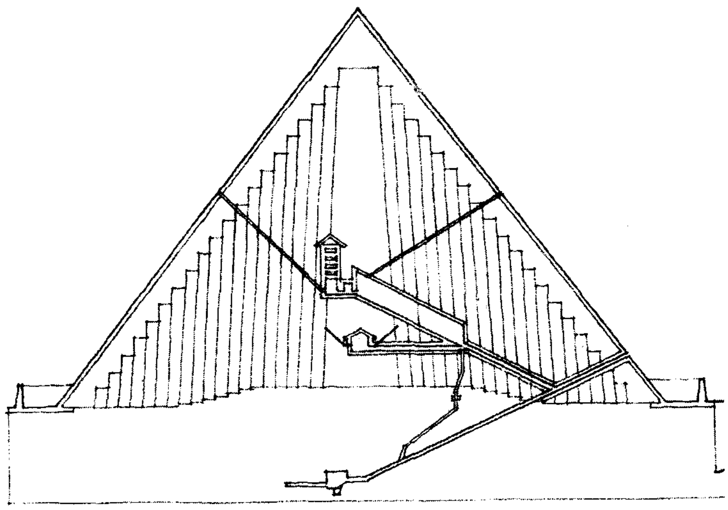
Modern Art Museum, Caracas, Venezuela, 1955, Oscar Niemeyer

现代艺术博物馆，加拉加斯，委内瑞拉，1955年，O.尼迈耶



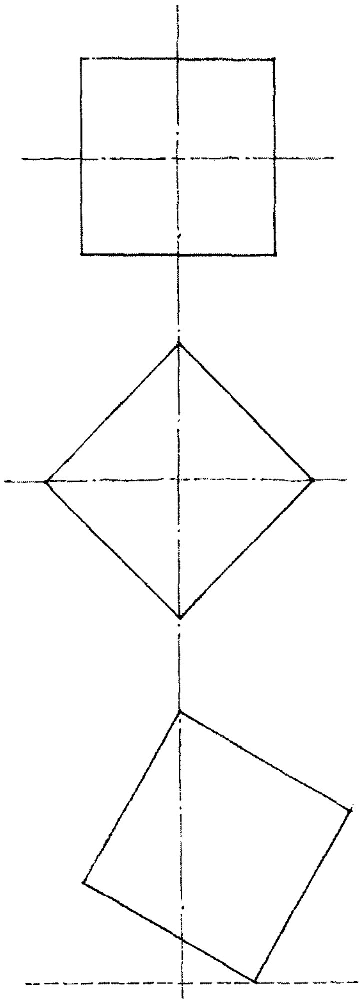
Vigo Sundt House, Madison, Wisconsin, 1942, Frank Lloyd Wright

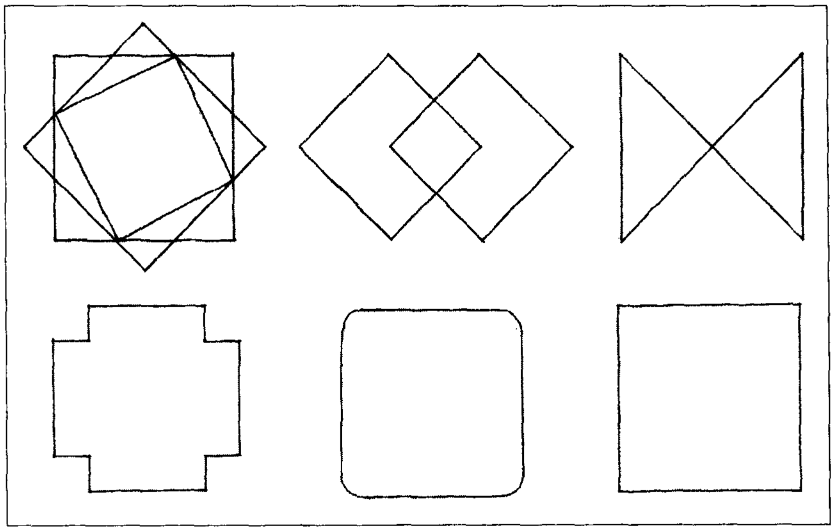
V. 桑兹住宅，麦迪逊，威斯康星州，1942年，F. L. 莱特



Great Pyramid of Cheops at Giza, Egypt, c. 2500 B.C.

吉萨的齐奥普斯大金字塔，埃及，公元前2500年



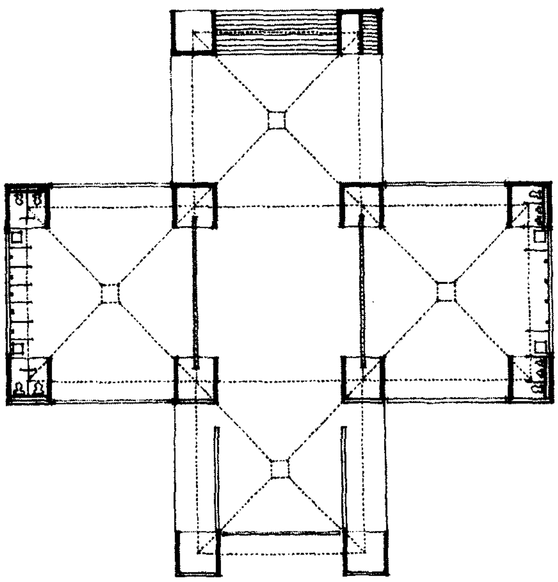


Compositions resulting from the rotation and modification of the square

正方形经旋转和变化所得到的构图

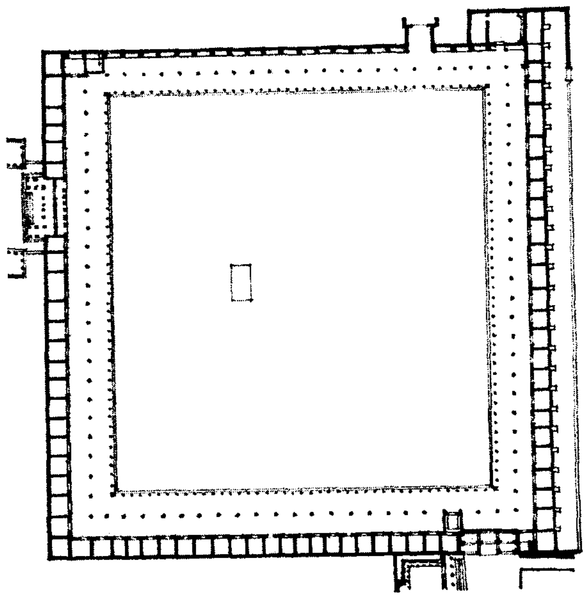
The square represents the pure and the rational. It is a static and neutral figure having no preferred direction. All other rectangles can be considered variations of the square—deviations from the norm by the addition of height or width. Like the triangle, the square is stable when resting on one of its sides, and dynamic when standing on one its corners.

正方形代表着纯粹和理性。它是一种静态的、中性的图形，没有主导方向。所有的矩形都可以看成是正方形的变体，是常态下增加其高度或宽度变化而成的。像三角形一样，正方形当坐落在它的一条边上时是稳定的，当以其一角为支撑时则是动态的。



Bathhouse, Jewish Community Center, Trenton, New Jersey, 1954–1959, Louis Kahn

浴室，犹太社区中心，特伦顿，新泽西州，1954年—1959年，L. 康



Agora of Ephesus, Asia Minor

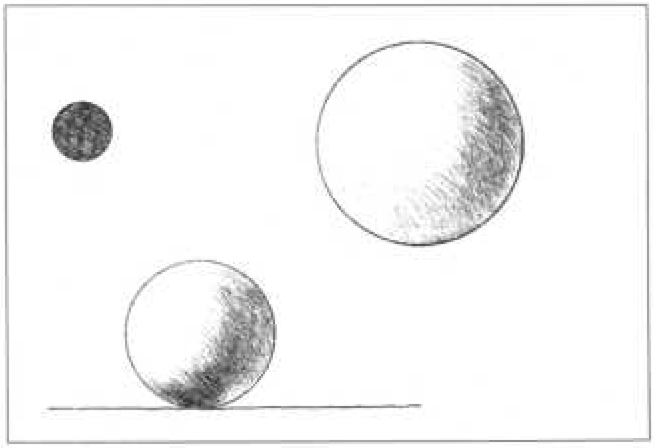
以弗所的大会场，小亚细亚

"...cubes, cones, spheres, cylinders, or pyramids are the great primary forms that light reveals to advantage; the image of these is distinct and tangible within us and without ambiguity. It is for this reason that these are beautiful forms, the most beautiful forms." *Le Corbusier*

"……立方体、圆锥体、球体、圆柱体或者棱锥体，都是伟大的基本形式，它们明确地反映了这些形状的优越性。这些形状对于我们是鲜明的、实在的、毫不含糊的。由于这个原因，这些形式是美的，而且是最美的形式。"（勒·柯布西埃）

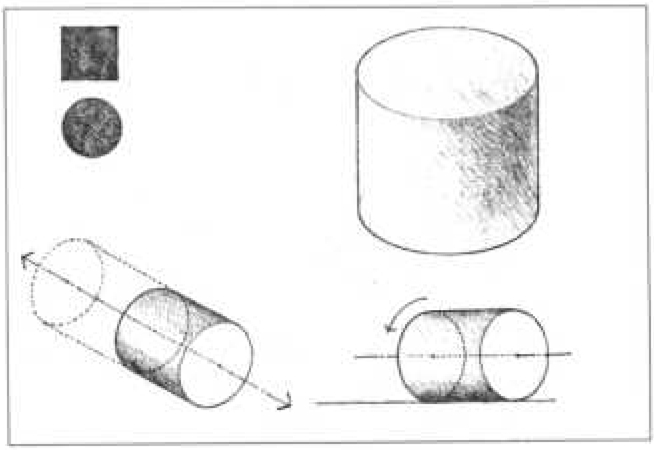
The primary shapes can be extended or rotated to generate volumetric forms or solids which are distinct, regular, and easily recognizable. Circles generate spheres and cylinders; triangles generate cones and pyramids; squares generate cubes. In this context, the term solid does not refer to firmness of substance but rather to a three-dimensional geometric body or figure.

基本形状可以被展开或旋转以产生体的形式或实体，这些实体是独特的，规则的并且容易识别。圆可以派生球和圆柱；三角形可以派生圆锥和棱锥；正方形则派生立方体。在这种背景下，实体一词不是指物质的稳固状态，而是指三度几何体或图形。



Sphere A solid generated by the revolution of a semicircle about its diameter, whose surface is at all points equidistant from the center. A sphere is a centralized and highly concentrated form. Like the circle from which it is generated, it is self-centering and normally stable in its environment. It can be inclined toward a rotary motion when placed on a sloping plane. From any viewpoint, it retains its circular shape.

球体 球体是由半圆围绕其直径旋转而成的，球面的每一点到圆心的距离都相等。球体是一个向心性和高度集中性的形式，像它的原生形式——圆一样，在它所处的环境中可以产生自我为中心的感觉，通常呈稳定的状态。当它处于一个斜面上的时候，它可以朝一个方向倾斜运动。从任何视点来看，它都保持圆形。

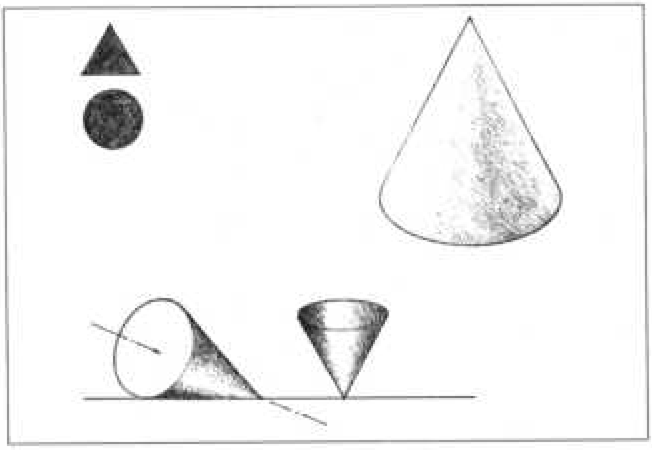


Cylinder A solid generated by the revolution of a rectangle about one of its sides. A cylinder is centralized about the axis passing through the centers of its two circular faces. Along this axis, it can be easily extended. The cylinder is stable if it rests on one of its circular faces; it becomes unstable when its central axis is inclined from the vertical.

圆柱体 圆柱体是由一个矩形围绕其一条边旋转而成的。圆柱体是以通过两个圆形表面圆心的轴线为中心的。圆柱体可以很容易地沿着此轴延长。如果以其圆形表面为底座，圆柱则呈一种静态的形式。当中轴从垂直状态倾斜时，它就处于一种不稳定的状态。

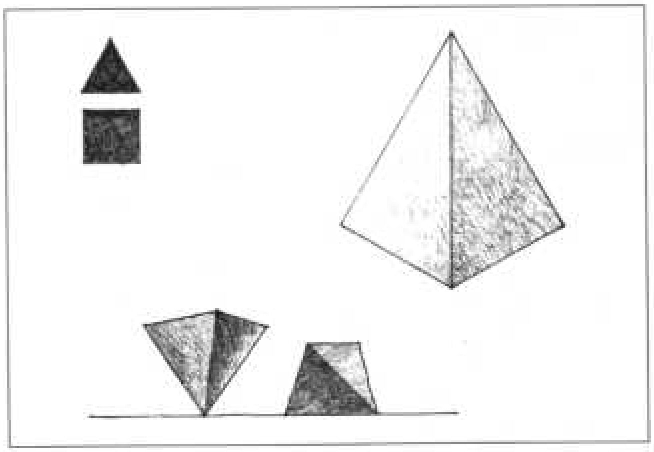
Cone A solid generated by the revolution of a right triangle about one of its sides. Like the cylinder, the cone is a highly stable form when resting on its circular base, and unstable when its vertical axis is tipped or overturned. It can also rest on its apex in a precarious state of balance.

圆锥 圆锥体是一个直角三角形围绕其一直角边旋转而成的。像圆柱一样，当它以圆形基面为底座的时候，圆锥是个非常稳定的形式；当它的垂直轴倾斜或倾倒的时候，它就是一种不稳定的形式。它也可以尖顶朝下直立起来，呈现出一种不稳定的平衡状态。



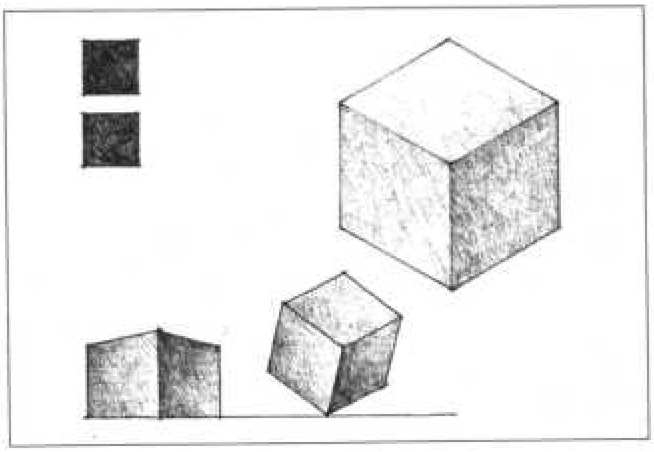
Pyramid A polyhedron having a polygonal base and triangular faces meeting at a common point or vertex. The pyramid has properties similar to those of the cone. Because all of its surfaces are flat planes, however, the pyramid can rest in a stable manner on any of its faces. While the cone is a soft form, the pyramid is relatively hard and angular.

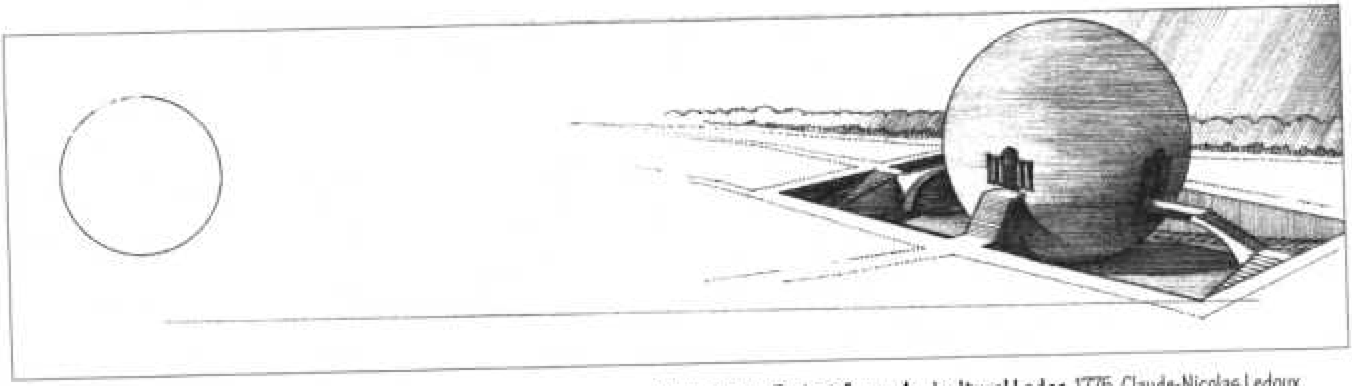
棱锥 棱锥是一个多面体，具有多边形底座和三角形基面。这些三角形基面汇聚于一个普通的点，即顶点。棱锥的属性与圆锥相似，但是由于它所有的表面都是平面，棱锥以任一表面为底座都呈稳定状态。圆锥是一种柔和的形式，而棱锥相对而言则是带棱带角、比较坚硬的形式。



Cube A prismatic solid bounded by six equal square sides, the angle between any two adjacent faces being a right angle. Because of the equality of its dimensions, the cube is a static form that lacks apparent movement or direction. It is a stable form except when it stands on one of its edges or corners. Even though its angular profile is affected by our point of view, the cube remains a highly recognizable form.

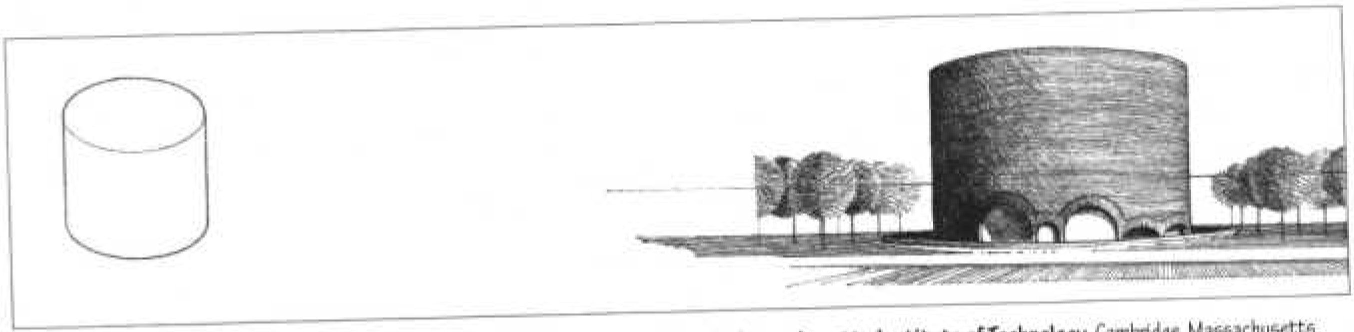
立方体 立方体是一个有棱角的实体，有六个尺寸相等的面，任意两个相邻面的夹角都是直角。由于它的几个量度相等，立方体是一种静止的形式，缺乏明显的运动感和方向性。立方体除了站立在其边或角上时，总是一种稳定的形式。即使立方体带有棱角的侧面会因为我们的视点而受到影响，它仍然是很容易辨认的形式。





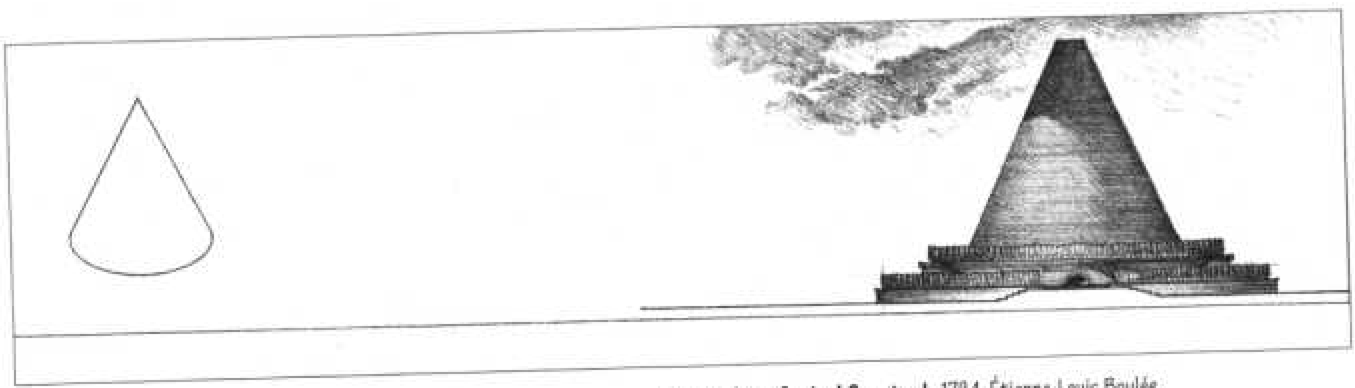
Maupertius, Project for an Agricultural Lodge, 1775, Claude-Nicolas Ledoux

毛波蒂亚斯，农庄住屋方案，1775年，C.-N.列杜



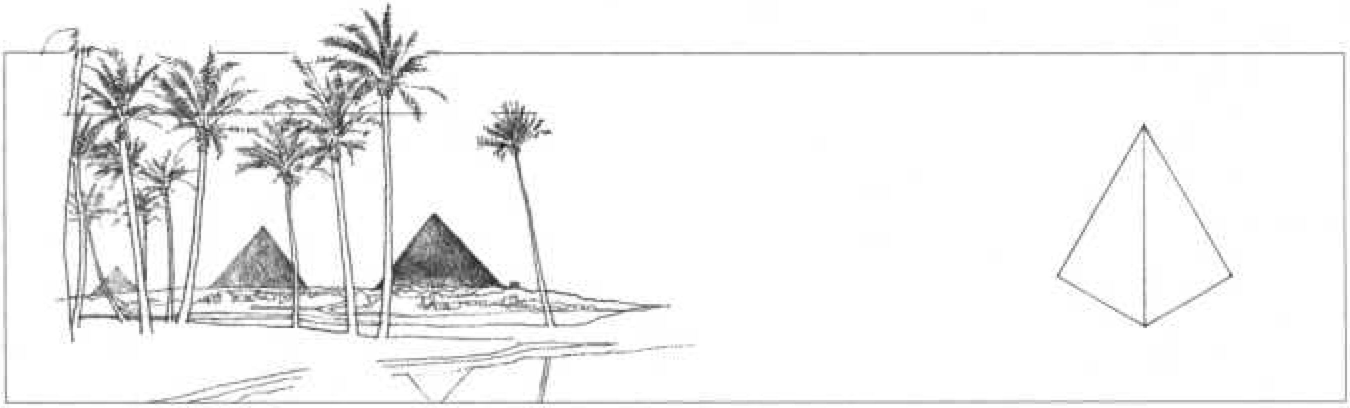
Chapel, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1955, Eero Saarinen and Associates

小教堂，麻省理工学院，剑桥，马萨诸塞州，1955年，E.沙里宁事务所

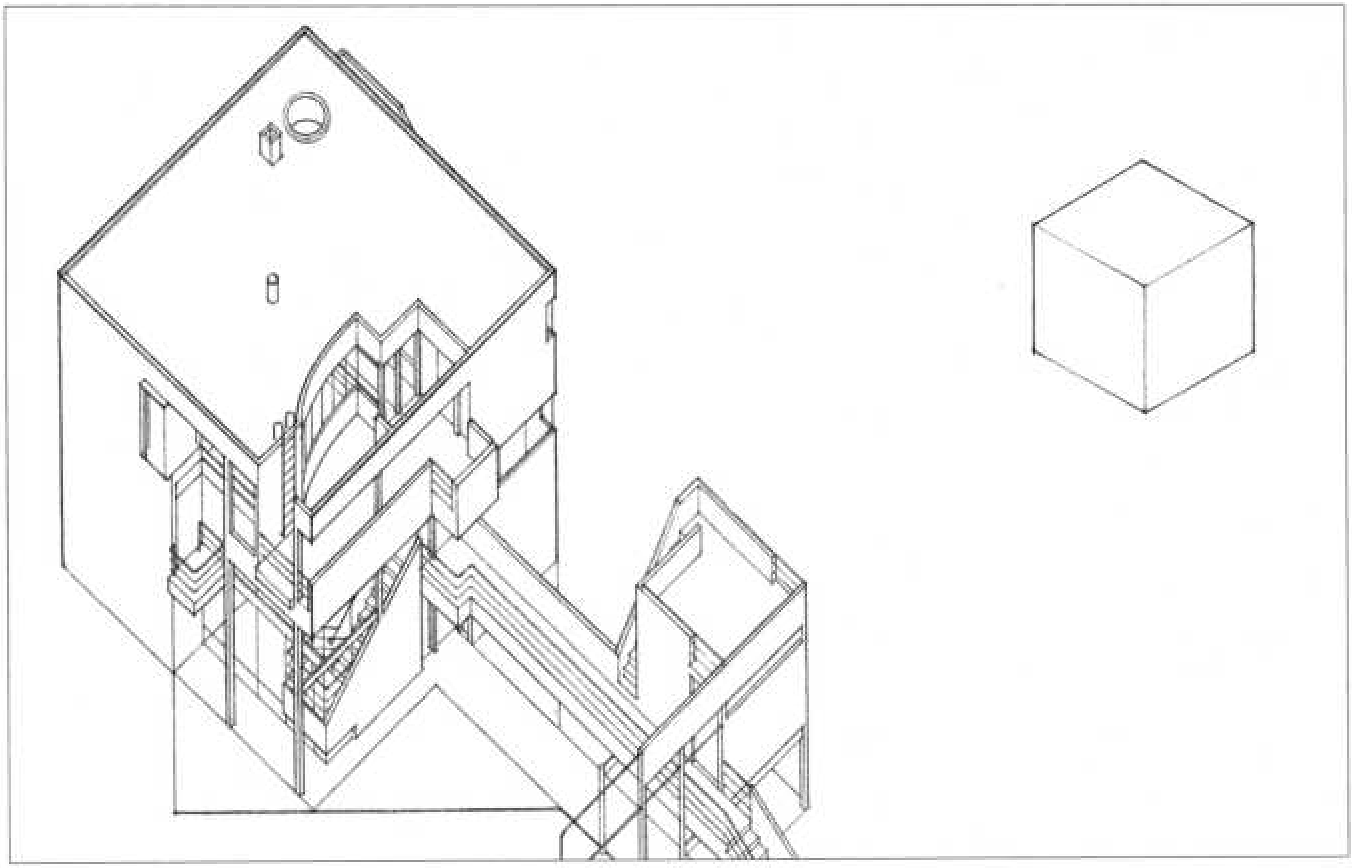


Project for a Conical Cenotaph, 1784, Étienne-Louis Boulée

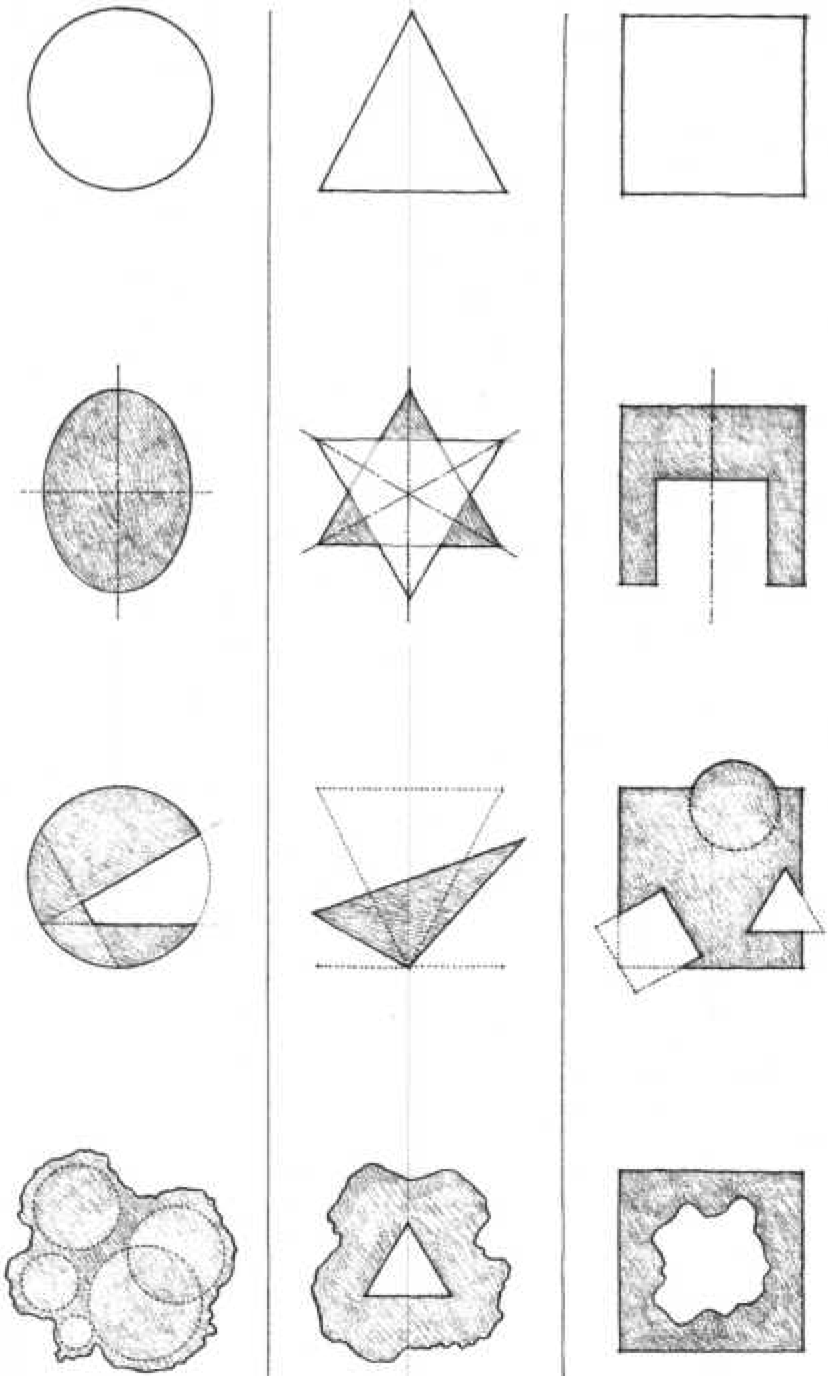
圆锥形纪念塔方案，1784年，É.-L.伯力



Pyramids of Cheops, Chephren, and Mykerinos *at Giza, Egypt, c. 2500 B.C.*
吉萨的金字塔群，齐奥普斯、齐夫伦和麦克林诺斯金字塔，埃及，公元前2500年



Hanselmann House, Fort Wayne, Indiana, 1967, Michael Graves
汉西尔曼住宅，富特韦恩，印第安纳州，1967年，M.格雷夫斯



Regular forms refer to those whose parts are related to one another in a consistent and orderly manner. They are generally stable in nature and symmetrical about one or more axes. The sphere, cylinder, cone, cube, and pyramid are prime examples of regular forms.

规则的形式是指那些各组成部分之间以稳定和有序的方式彼此关联的形式。这些形式的性质基本上是固定的，关于一条或多条轴线对称。球体、圆柱、圆锥、立方体是规则形式的主要实例。

Forms can retain their regularity even when transformed dimensionally or by the addition or subtraction of elements. From our experiences with similar forms, we can construct a mental model of the original whole even when a fragment is missing or another part is added.

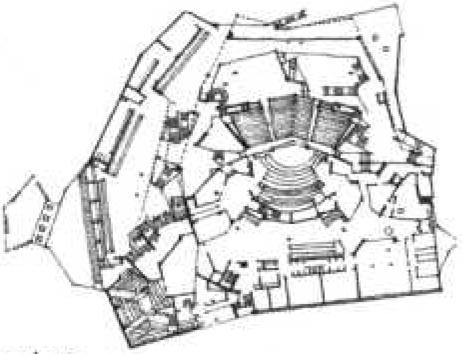
即使在量度发生变化或增减要素的时候，形式仍能保持其规则性。即使在形式的某一部分消失或另一部分增加进来的时候，依据我们对于类似形式的经验，我们仍能在头脑中建构一个有关这一形式基本形象的模型。

Irregular forms are those whose parts are dissimilar in nature and related to one another in an inconsistent manner. They are generally asymmetrical and more dynamic than regular forms. They can be regular forms from which irregular elements have been subtracted or result from an irregular composition of regular forms.

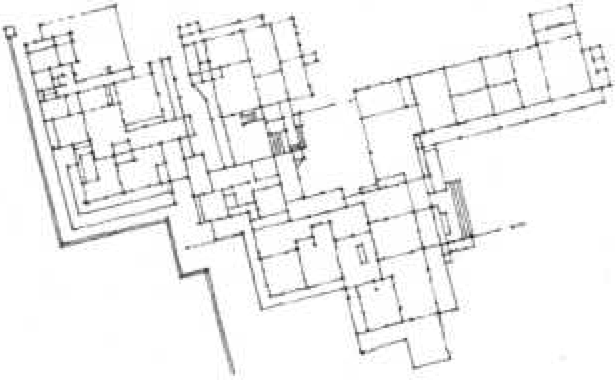
不规则的形式是指那些各组成部分在性质上不同且以不稳定的方式组合在一起的形式。不规则的形式一般是不对称的，比规则形式更富有动态。它们可能是规则形式中减去不规则要素的结果，或者是规则形式的不规则构图所致。

Since we deal with both solid masses and spatial voids in architecture, regular forms can be contained within irregular forms. In a similar manner, irregular forms can be enclosed by regular forms.

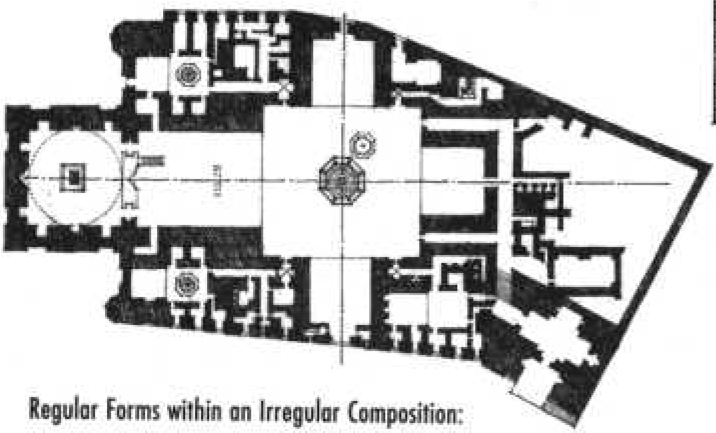
因为我们在建筑中既要处理实体，又要处理虚空，所以规则形式可能包含在不规则形式之中；同样，不规则形式也可以被规则形式围合起来。



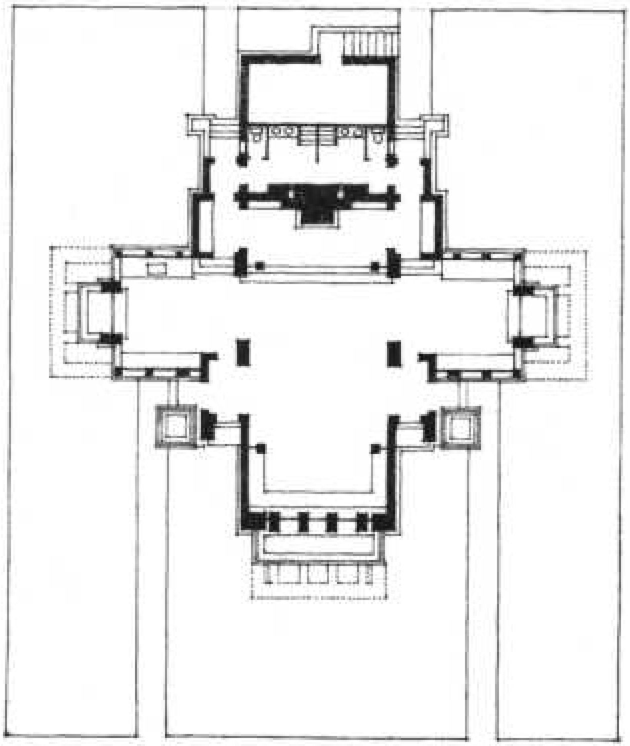
Irregular Forms:
Philharmonic Hall, Berlin, 1956–1963, Hans Scharoun
不规则形式：
爱乐音乐厅，柏林，1956年—1963年，H. 夏隆



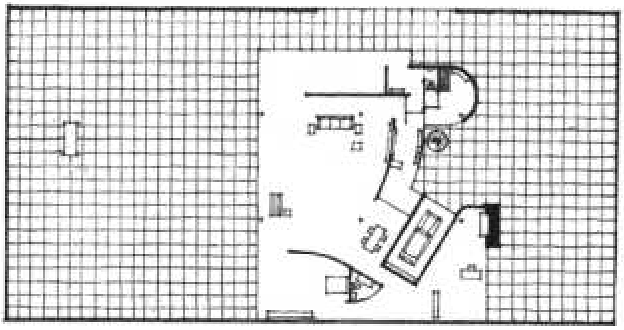
An Irregular Composition of Regular Forms:
Katsura Palace, Kyoto, Japan, 17th century
由规则形式组成的不规则构图：
桂离宫，京都，日本，17世纪



Regular Forms within an Irregular Composition:
Mosque of Sultan Hasan, Cairo, Egypt, 1356–1363
不规则构图中的规则形式：
苏尔坦·哈桑清真寺，开罗，埃及，1356年—1363年



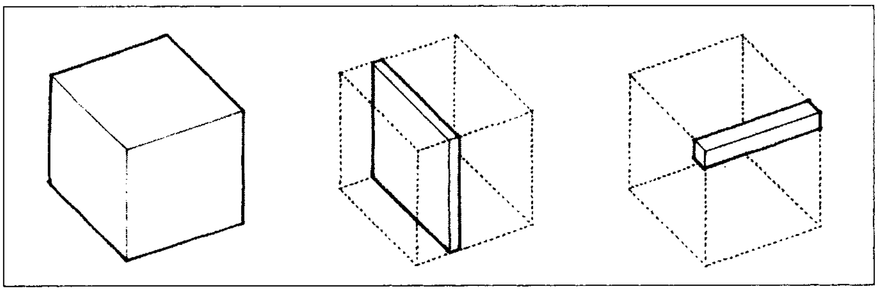
A Regular Composition of Regular Forms:
Coonley Playhouse, Riverside, Illinois, 1912, Frank Lloyd Wright
由规则形式组成的规则构图：
孔利游艺室，里弗赛德，伊利诺斯州，1912年，F. L. 莱特



Irregular Forms within a Regular Field:
Courtyard House Project, 1934, Mies van de Rohe
规则领域内的不规则形式：
庭院住宅方案，1934年，密斯·凡德罗

All other forms can be understood to be transformations of the primary solids, variations which are generated by the manipulation of one or more dimensions or by the addition or subtraction of elements.

所有的其他形式都可以被理解为基本实体的变形。这些变化来自对于基本实体的一个量度或多量度的处理，或者是由于要素的增减而产生的。

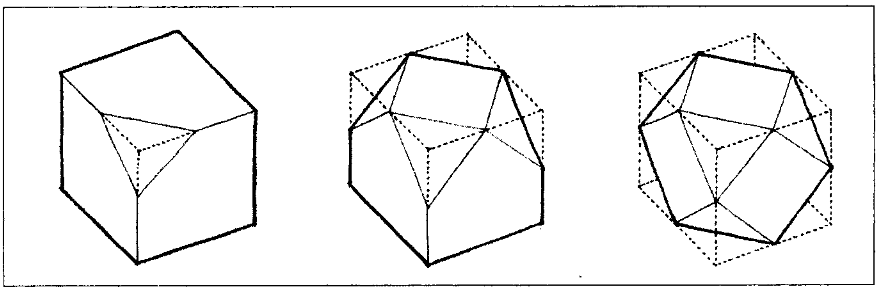


Dimensional Transformation

A form can be transformed by altering one or more of its dimensions and still retain its identity as a member of a family of forms. A cube, for example, can be transformed into similar prismatic forms through discrete changes in height, width, or length. It can be compressed into a planar form or be stretched out into a linear one.

量度的变化

通过改变一个或多个量度，一种形式就会发生变化，但是作为某一形式家族的成员，变化后的形式仍能保持其特性。比如，一个立方体可以通过在高度、宽度和长度上的连续变化，变成类似的棱柱形式。它可以被压缩成一个面的形式，或者被拉伸成线的形式。

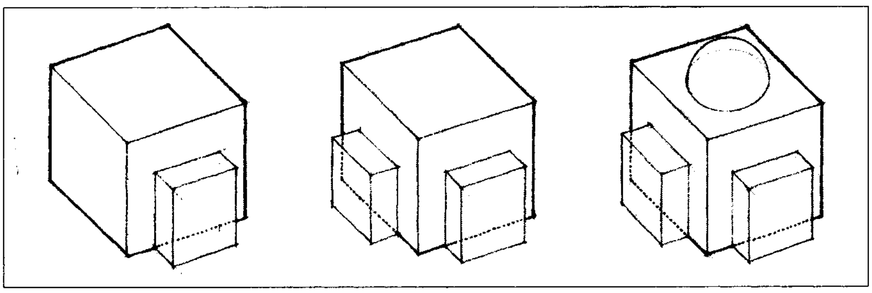


Subtractive Transformation

A form can be transformed by subtracting a portion of its volume. Depending on the extent of the subtractive process, the form can retain its initial identity or be transformed into a form of another family. For example, a cube can retain its identity as a cube even though a portion of it is removed, or be transformed into a series of regular polyhedrons that begin to approximate a sphere.

削减式变化

一种形式可以通过削减其部分容积的方法来进行变化。根据不同的削减程度，形式可以保持其最初的特性，或者变成另一种类的形式。比如，一个正方体即使有一部分被削去，仍能保持其特性，或者变成逐渐接近球体的一系列规则多面体。



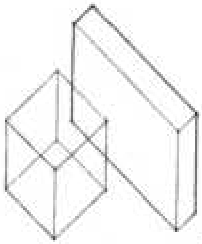
Additive Transformation

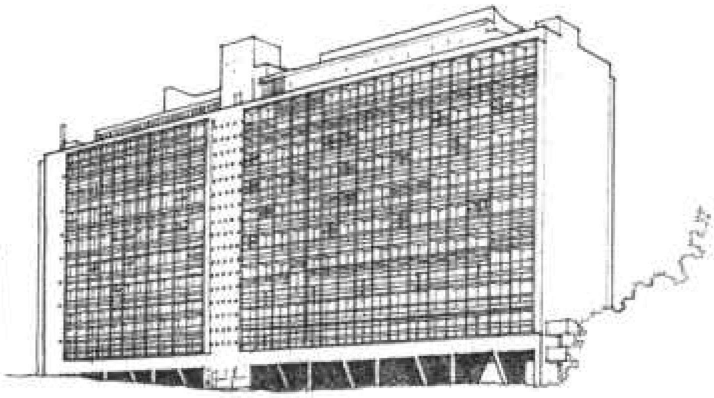
A form can be transformed by the addition of elements to its volume. The nature of the additive process and the number and relative sizes of the elements being attached determine whether the identity of the initial form is altered or retained.

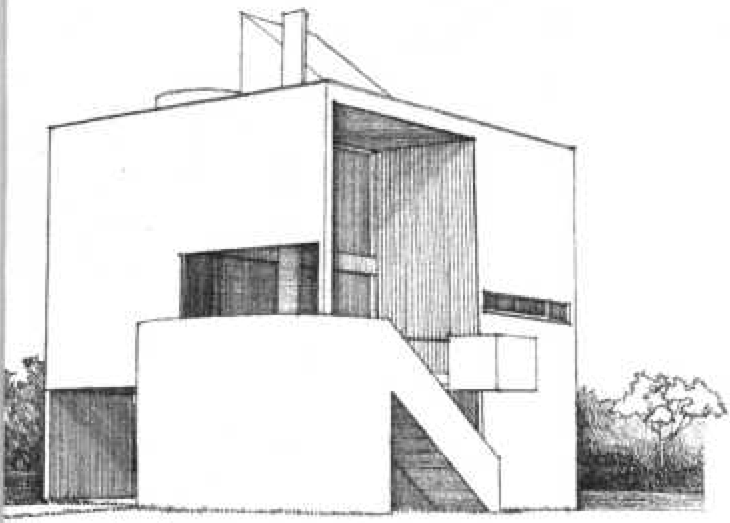
增加式变化

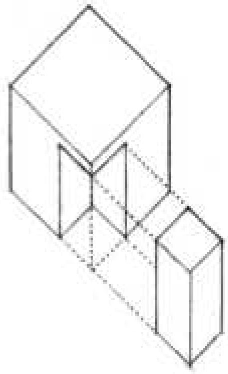
一种形式可以通过在其容积上增加要素的方法取得变化。增加过程的性质、添加要素的数量和相对规模，决定了原来形式的特性是被改变了还是被保留下来。

Dimensional Transformation of a Cube into a Vertical Slab:
Unité d'Habitation, *Firminy-Vert, France, 1963–1968, Le Corbusier*
立方体通过量度的变化而成为竖板：
居住单位，菲尔米尼—弗特，法国，1963年—1968年，勒·柯布西埃

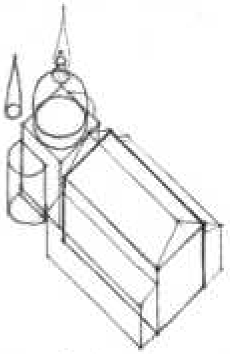






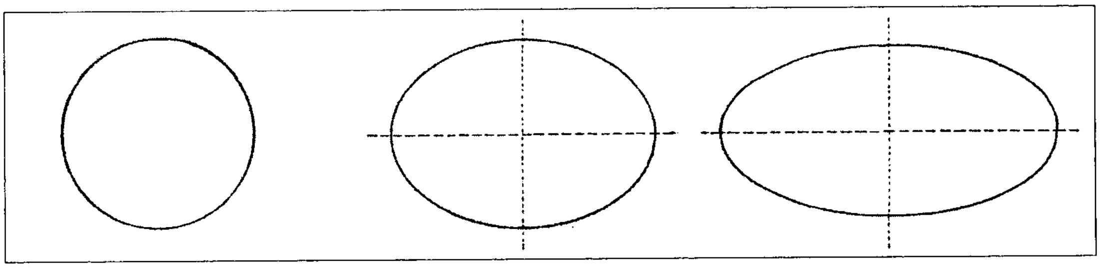


Subtractive Transformation Creating Volumes of Space:
Gwathmey Residence, *Amagensett, New York, 1967,*
Charles Gwathmey/Gwathmey Siegel
削减式变化带来空间的容积：
格瓦斯梅住宅，阿玟根赛特，纽约州，1967年，C.格瓦斯梅/格瓦斯梅·西格尔



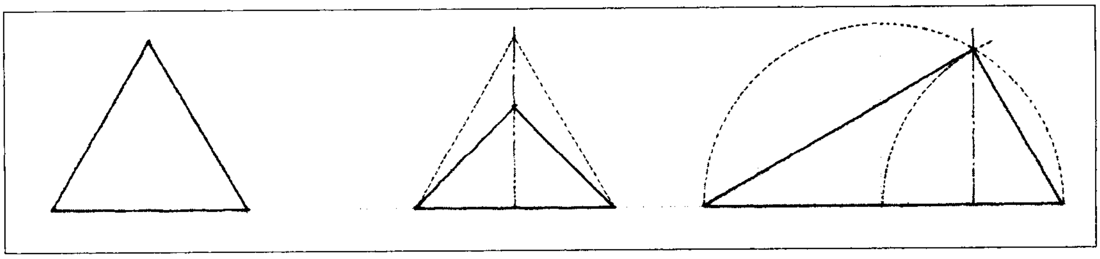


Additive Transformation of a Parent Form by the Attachment of Subordinate Parts:
Il Redentore, *Venice, 1577–1592, Andrea Palladio*
增加式变化——主体形式与从属部分相连：
伊尔·瑞登托，威尼斯，1577年—1592年，A.帕拉蒂奥



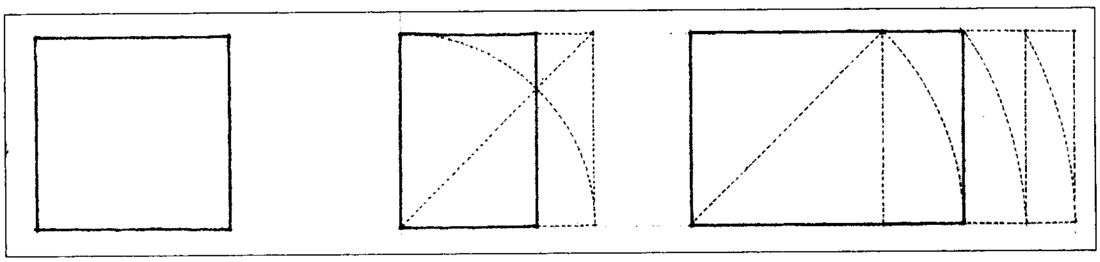
A sphere can be transformed into any number of ovoid or ellipsoidal forms by elongating it along an axis.

一个球体可以通过沿某一轴线拉伸的方法，变成无数的卵圆体或椭球。



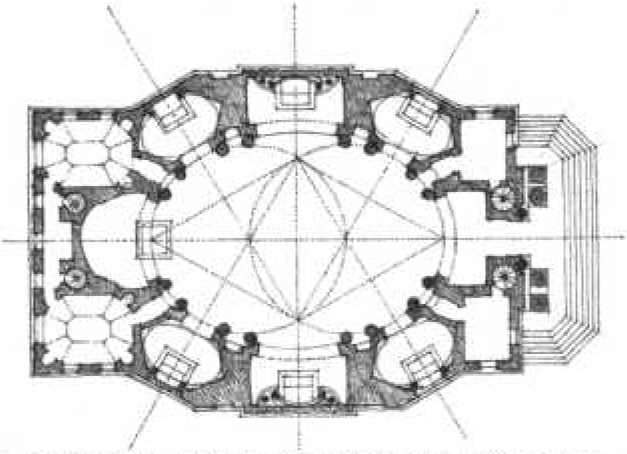
A pyramid can be transformed by altering the dimensions of the base, modifying the height of the apex, or tilting the normally vertical axis.

一个棱锥体，可以通过改变其底边量度，改变顶点高度，或使垂直轴偏向一边的方法来进行变化。



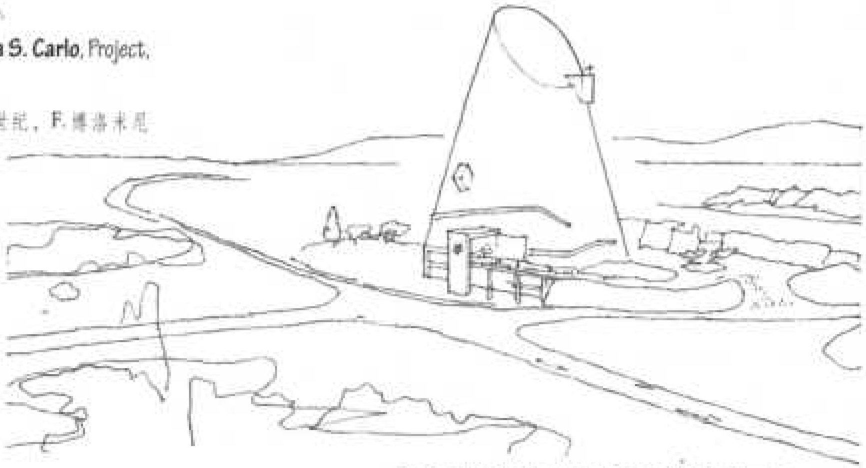
A cube can be transformed into similar prismatic forms by shortening or elongating its height, width, or depth.

一个立方体，可以通过缩短或延长其高度、宽度或深度的方法，变化成矩形棱体。



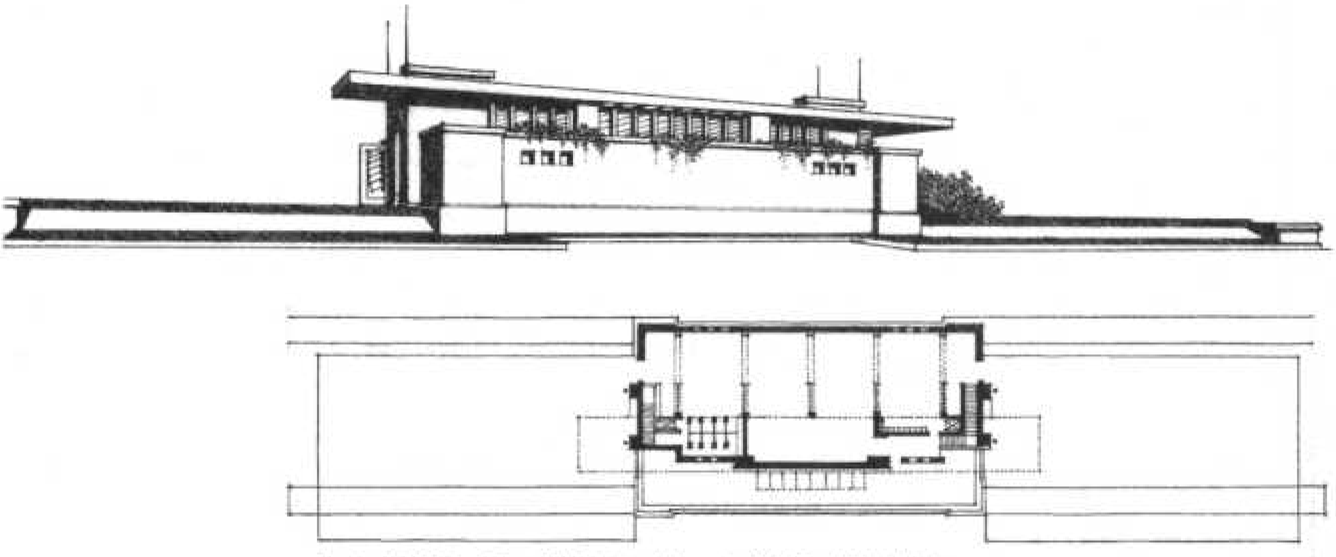
Plan of an Elliptical Church, Pensiero Della Chiesa S. Carlo, Project, 17th century, Francesco Borromini

椭圆形的教堂平面，S. 卡洛教堂意象，方案，17世纪，F. 博洛米尼



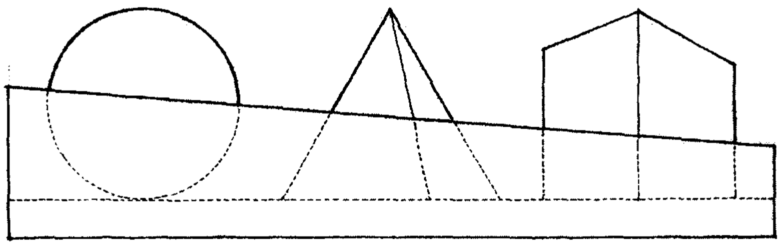
St. Pierre, Firminy-Vert, France, 1965, Le Corbusier

圣·皮埃尔教堂，菲尔米尼一弗特，法国，1965年，勒·柯布西埃



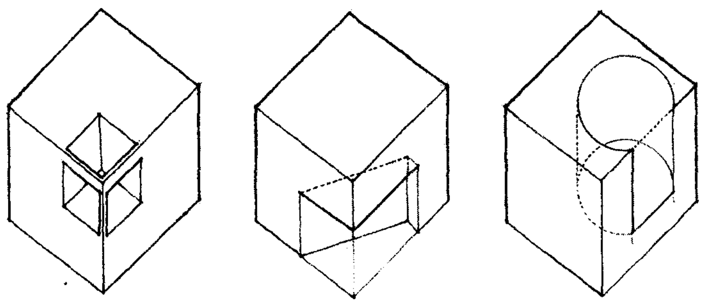
Project for Yahara Boat Club, Madison, Wisconsin, 1902, Frank Lloyd Wright

亚哈拉船艇俱乐部方案，麦迪逊，威斯康星州，1902年，F. L. 莱特



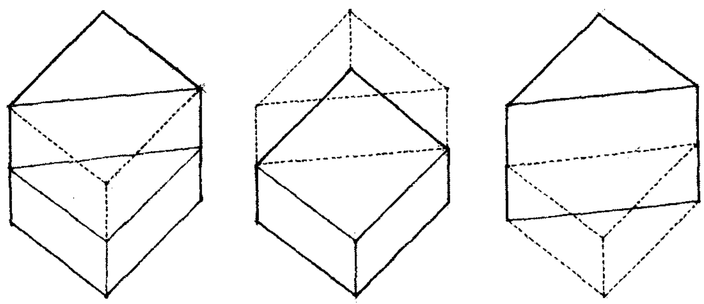
We search for regularity and continuity in the forms we see within our field of vision. If any of the primary solids is partially hidden from our view, we tend to complete its form and visualize it as if it were whole because the mind fills in what the eyes do not see. In a similar manner, when regular forms have fragments missing from their volumes, they retain their formal identities if we perceive them as incomplete wholes. We refer to these mutilated forms as subtractive forms.

我们在所见的视野内总是寻求形式的规则性和连续性。如果在我们的视野中，任何一个基本实体有一部分被遮挡起来，那么我们倾向于使其形式完善并视其为一个整体，这是因为大脑填补了眼睛没有看到的部分。同样，当规则的形式中有些部分从其体量上消失，如果我们把它们视作不完整的实体的话，这些形式则仍保持着它们的形式特性。我们把这些不完整的形式称为“削减的形式”。



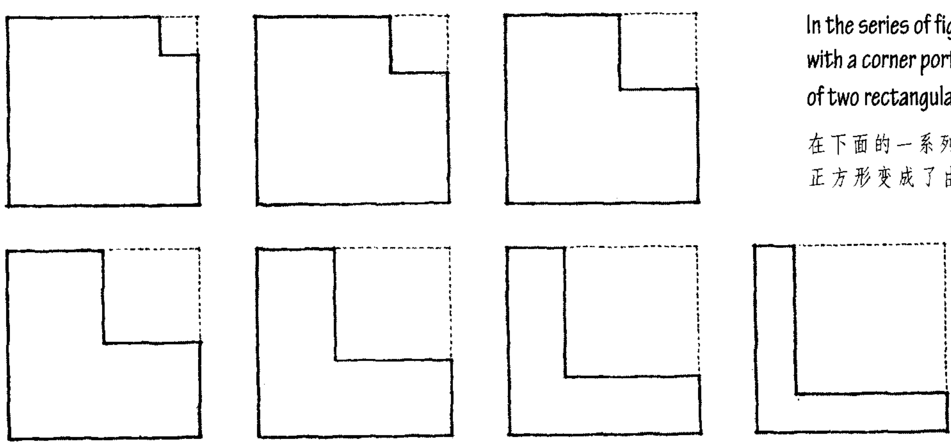
Because they are easily recognizable, simple geometric forms, such as the primary solids, adapt readily to subtractive treatment. These forms will retain their formal identities if portions of their volumes are removed without deteriorating their edges, corners, and overall profile.

由于简单的几何形体易于识别，比如我们提到的基本实体，就非常适于进行削减处理。假若不破坏这些形体的边、角和整体外轮廓，即使其体量中有些部分被去掉，那么这些形体仍将保留其形式特性。



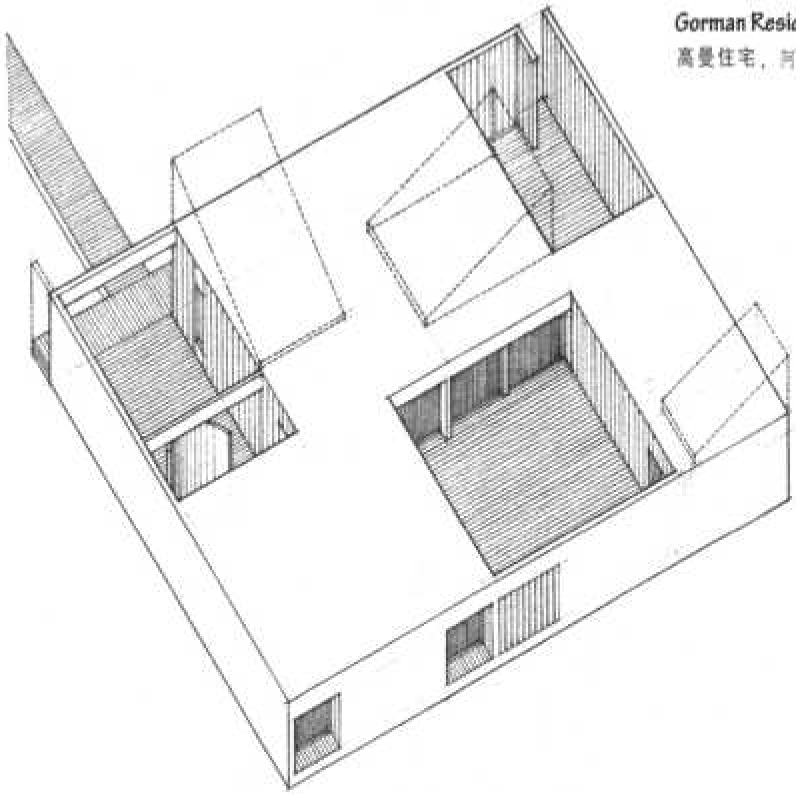
Ambiguity regarding the original identity of a form will result if the portion removed from its volume erodes its edges and drastically alters its profile.

如果从某一形式的体量上移去的部分侵蚀了其边缘并彻底地改变了其轮廓，那么这种形式原来的本性就会变得模糊起来。

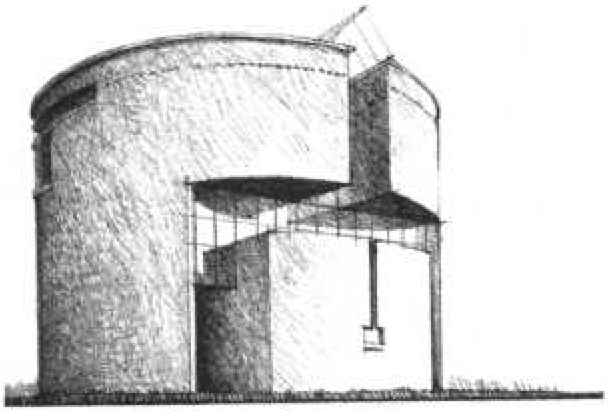


In the series of figures below, at what point does the square shape with a corner portion removed become an L-shaped configuration of two rectangular planes?

在下面的一系列图形中，从哪一个图形开始，去掉一角的正方形变成了由两个矩形组成的L形？



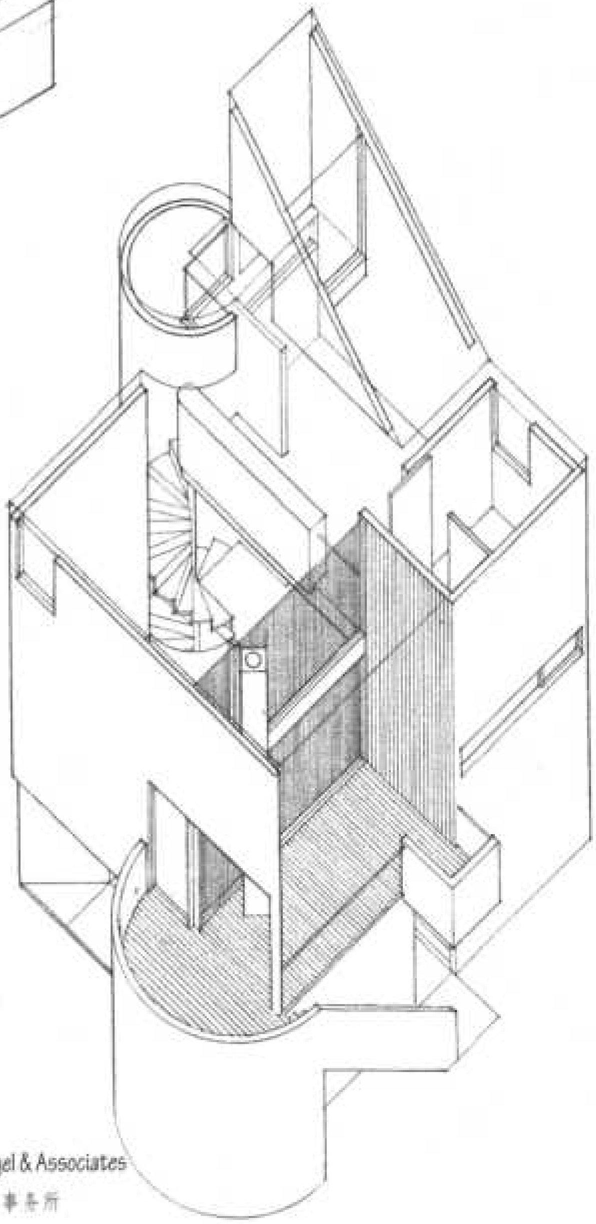
Gorman Residence, Amagansett, New York, 1968, Julian and Barbara Neski
高曼住宅，阿梅金塞特，纽约州，1968年，朱丽安与B. 尼斯基



House at Stabio, Switzerland, 1981, Mario Botta
斯台比尔住宅，瑞士，1981年，M. 博塔

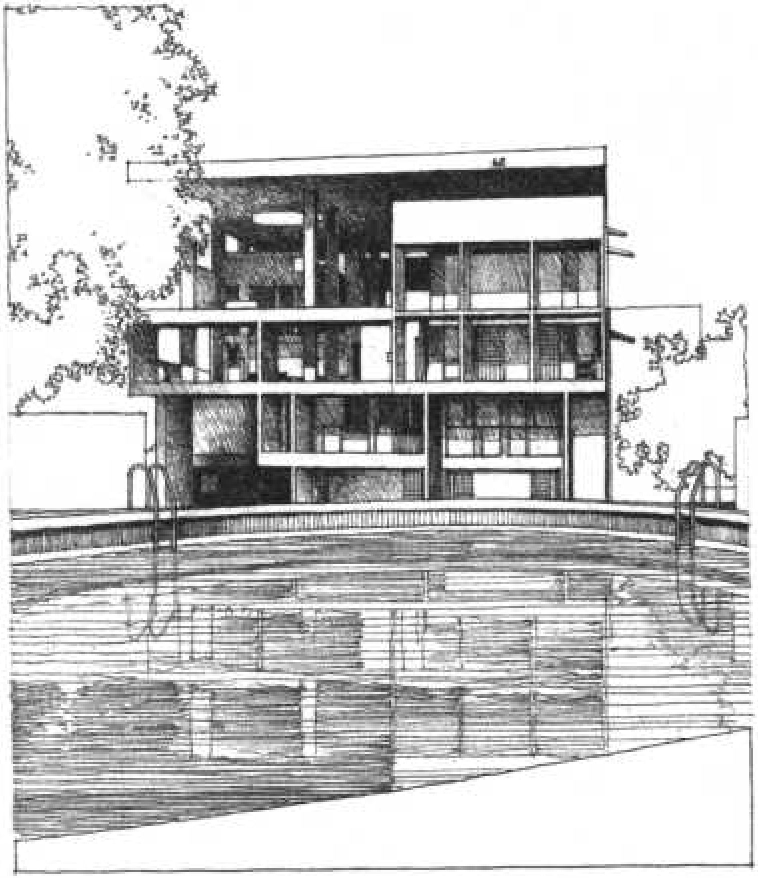
Spatial volumes may be subtracted from a form to create recessed entrances, positive courtyard spaces, or window openings shaded by the vertical and horizontal surfaces of the recess.

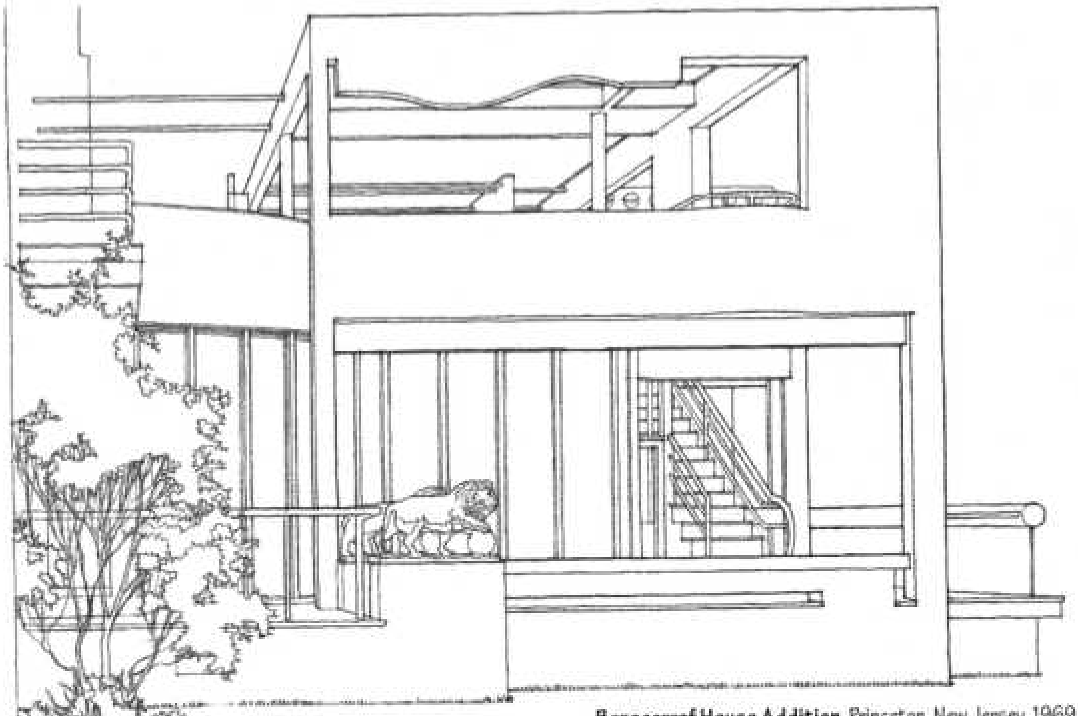
可以从某个形式中削减一些容积，以形成凹进的入口、明确的庭院空间，或者由凹处的垂直或水平的表面来遮挡的窗洞。



Gwathmey Residence, Amagansett, New York, 1967, Charles Gwathmey/Gwathmey Siegel & Associates
格瓦斯梅住宅，阿迈根赛特，纽约州，1967年，C. 格瓦斯梅/格瓦斯梅·西格尔事务所

Shodhan House, Ahmedabad, India, 1956, Le Corbusier
舒德汉住宅，艾哈迈达巴德，印度，1956年，勒·柯布西埃



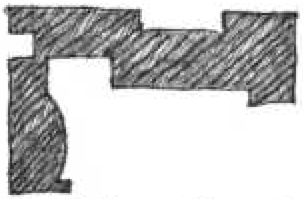
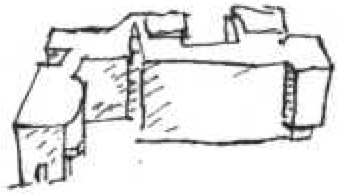


Benacerraf House Addition, Princeton, New Jersey, 1969, Michael Graves
本纳塞拉夫住宅加建，普林斯顿，新泽西州，1969年，M. 格雷夫斯

Le Corbusier comments on form:
勒·柯布西埃对形式的评论：

"Cumulative Composition
- additive form
- a rather easy type
- picturesque; full of movement
- can be completely disciplined by classification and hierarchy"

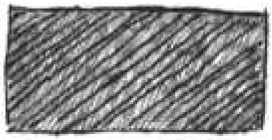
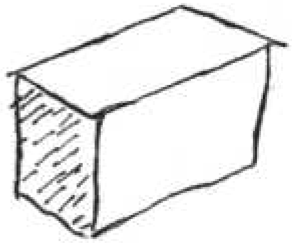
"积累式构图
- 增加的形式
- 一种相当容易的类型
- 美丽如画，充满动感
- 可以完全服从于分类和分级系统"

La Roche-Jeanneret Houses, Paris
洛奇—让纳亥住宅，巴黎

"Cubic Compositions (Pure Prisms)
- very difficult
  (to satisfy the spirit)"

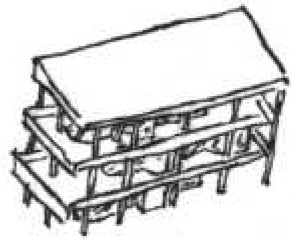
"立方体的构图（纯棱体）
- 非常困难
（去满足精神要求）"

Villa at Garches
加歇别墅

"very easy
- (convenient combining)"

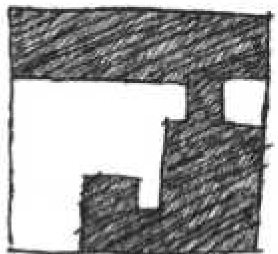
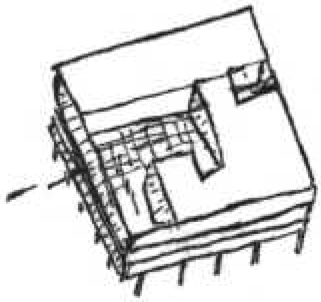
"非常容易
- （易于结合）"

House at Stuttgart
斯图加特住宅

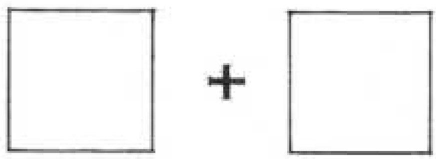
"subtractive form
- very generous
- on the exterior an architectural will is confirmed
- on the interior all functional needs are satisfied (light penetration, continuity, circulation)"

"削减的形式
- 非常大方
- 在外部，一个建筑立意得以确立
- 在内部，所有功能需要得以满足（光线渗透、连续性、流线）"

House at Poissy
普瓦西住宅

After a sketch, *Four House Forms*, by Le Corbusier for the cover of Volume Two of the *Oeuvre Complète*, published in 1935.
根据勒·柯布西埃为全集第二卷《四种住宅形式》的封面草图绘制，1935年出版

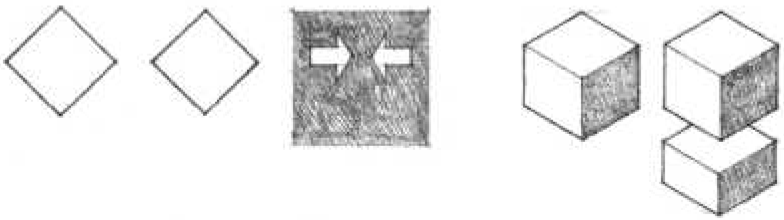


While a subtractive form results from the removal of a portion of its original volume, an additive form is produced by relating or physically attaching one or more subordinate forms to its volume.

削减的形式是从本体上移去一部分得到的，而增加的形式则产生于在原来的容积上连接或附加一个或多个从属形式。

The basic possibilities for grouping two or more forms are by:

两种或两种以上的形式组合在一起的基本可能性是：

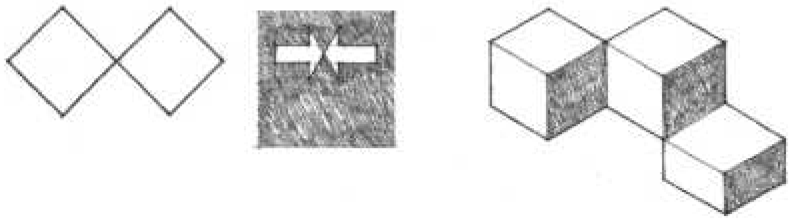


Spatial Tension

This type of relationship relies on the close proximity of the forms or their sharing of a common visual trait, such as shape, color, or material.

空间张力

这类关系需要形式彼此之间互相靠近，或者具有共同的视觉特点，比如形状、色彩或材料相近。

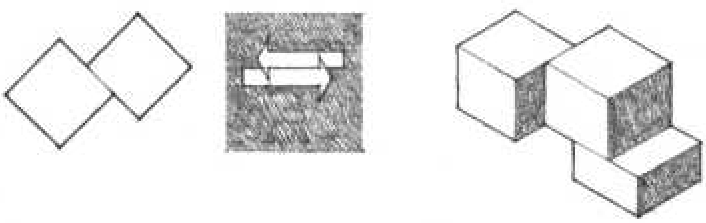


Edge-to-edge Contact

In this type of relationship, the forms share a common edge and can pivot about that edge.

边与边的接触

在这类关系中，形式具有共享的边，并且能够围绕此边转动。

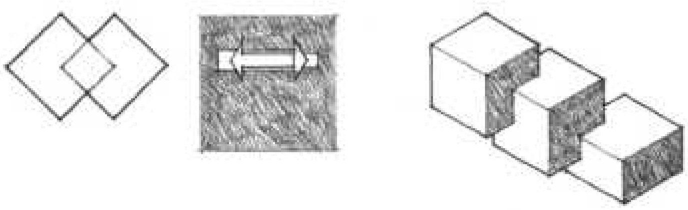


Face-to-face Contact

This type of relationship requires that the two forms have corresponding planar surfaces which are parallel to each other.

面与面的接触

这类关系要求两个形式具有相对应的、互相平行的表面。



Interlocking Volumes

In this type of relationship, the forms interpenetrate each other's space. The forms need not share any visual traits.

体量穿插

在这类关系中，形式互相贯穿到彼此的空间中。这些形体不需要具有共同的视觉特点。

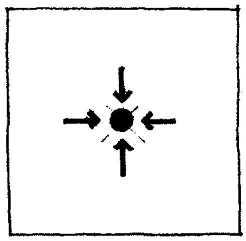
Additive forms resulting from the accretion of discrete elements can be characterized by their ability to grow and merge with other forms. For us to perceive additive groupings as unified compositions of form—as figures in our visual field—the combining elements must be related to one another in a coherent manner.

增加的形式来自独立要素的积聚，其特征是由它的增长能力及与其他形式合并的能力决定的。对我们而言，要把增加式组合作为形式的统一构图，作为我们视野中感受的形象，各组合要素必须以一种条理分明的方式彼此相连。

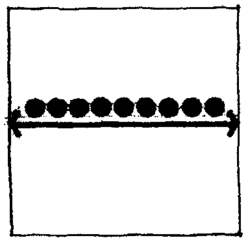
These diagrams categorize additive forms according to the nature of the relationships that exist among the component forms as well as their overall configurations. This outline of formal organizations should be compared with a parallel discussion of spatial organizations in Chapter 4.

这些图表将增加的形式进行了分类，分类的依据是存在于各组成形式之间关系的种类以及它们的总体造型。这个形式组合的框架，应该与第4章有关空间组合的相关讨论进行比较。

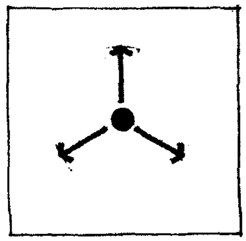
Centralized Form
A number of secondary forms clustered about a dominant, central parent-form.
集中形式
多个从属的形式围绕着一个占主导地位、居于中心的母体形式。



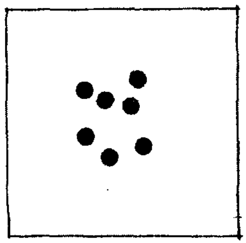
Linear Form
A series of forms arranged sequentially in a row.
线式形式
一系列形式按顺序排成一排。



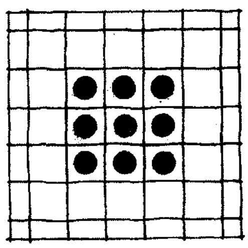
Radial Form
A composition of linear forms extending outward from a central form in a radial manner.
辐射形式
自中心形式向外伸展，呈辐射状的线式构图。

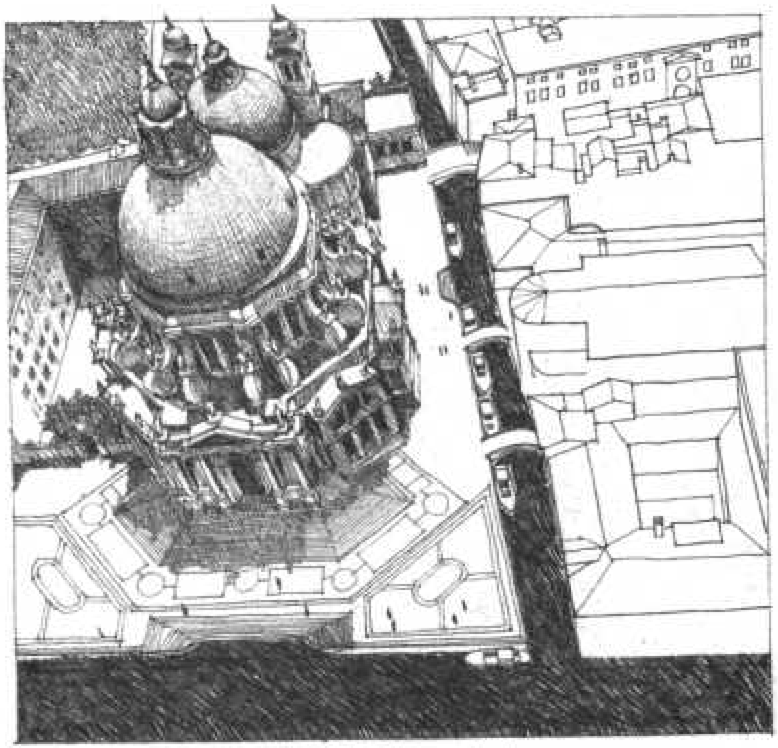


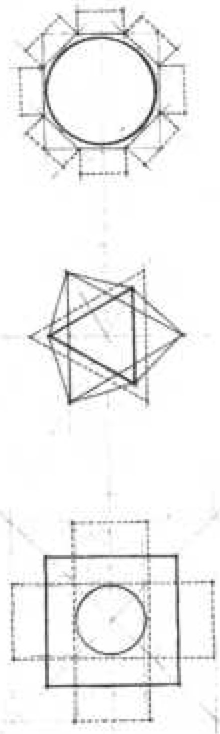
Clustered Form
A collection of forms grouped together by proximity or the sharing of a common visual trait.
组团式
由相近的或具有共同视觉特征的形式组合在一起。



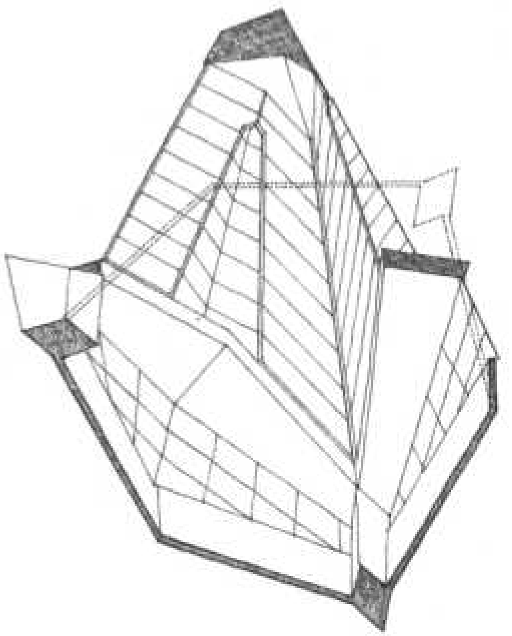
Grid Form
A set of modular forms related and regulated by a three-dimensional grid.
网格式
一组符合模数的形式被三度的网格联系起来并规则排列。



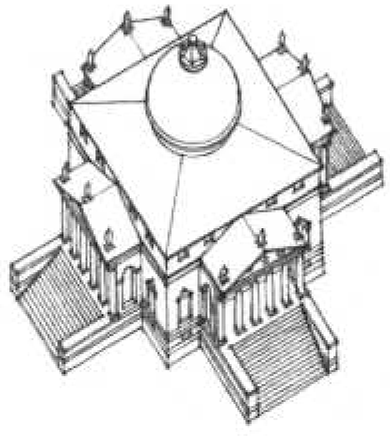




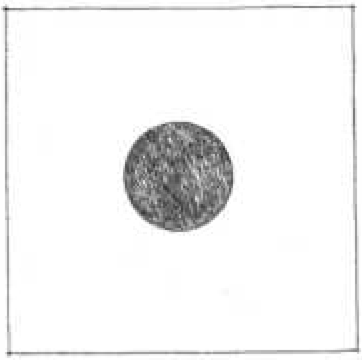
S. Maria Della Salute, *Venice, 1631–1682, Baldassare Longhena*
救主圣玛丽亚教堂，威尼斯，1631年—1682年，B.隆盖纳

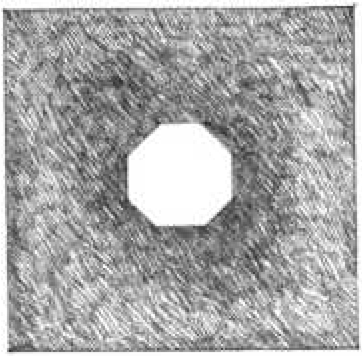


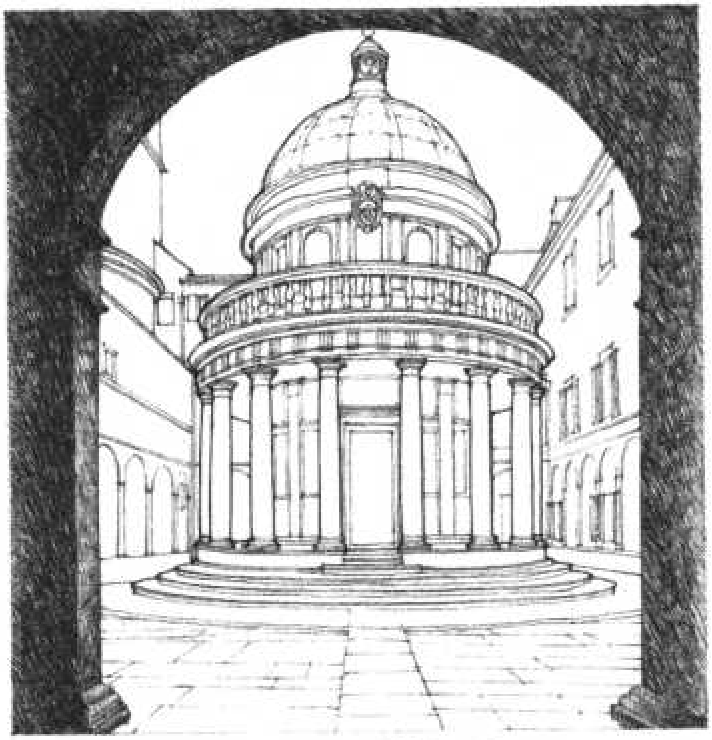
Beth Sholom Synagogue, Elkins Park, Pennsylvania, 1959, Frank Lloyd Wright
贝思·肖洛姆犹太教堂，爱尔金斯帕克，宾夕法尼亚州，1959年，F.L.莱特



Villa Capra (The Rotunda), Vicenza, Italy, 1552–1567, Andrea Palladio
卡普拉别墅（圆厅别墅），维琴察，意大利，1552年—1567年，A.帕拉第奥



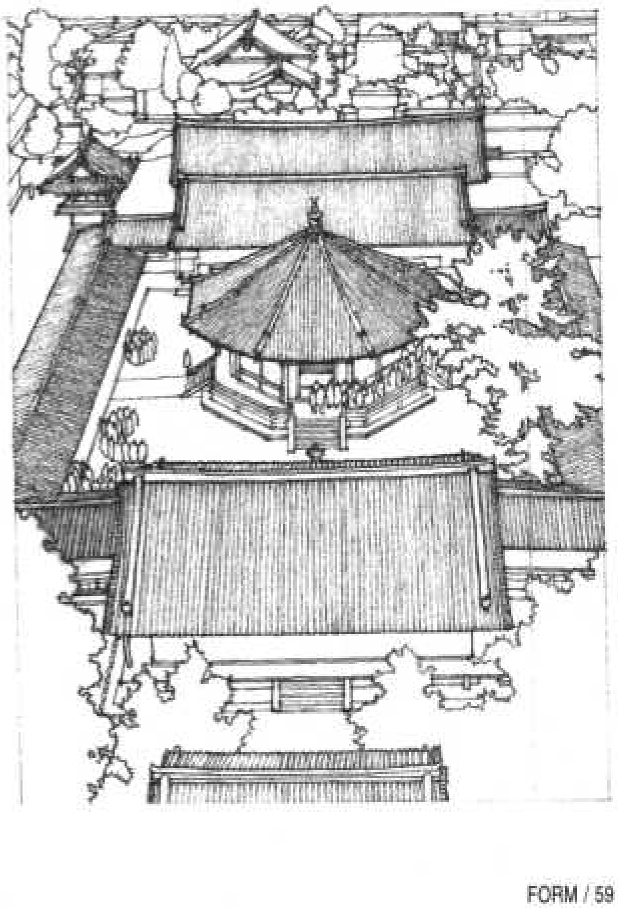




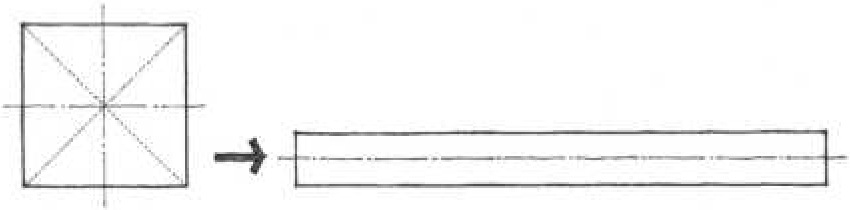
Tempietto, S. Pietro in Montorio, Rome, 1502, Donato Bramante
坦比埃多，蒙托里奥的圣彼得教堂，罗马，1502年，D.伯拉孟特

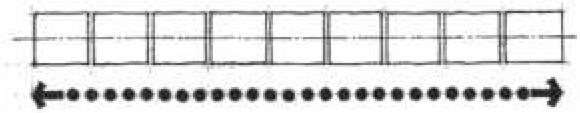
Centralized forms require the visual dominance of a geometrically regular, centrally located form, such as a sphere, cone, or cylinder. Because of their inherent centrality, these forms share the self-centering properties of the point and circle. They are ideal as freestanding structures isolated within their context, dominating a point in space, or occupying the center of a defined field. They can embody sacred or honorific places, or commemorate significant persons or events.

集中形式需要一个几何形体规整、居于中心位置的形式作为视觉主导，比如球体、圆锥体或圆柱体。因为这些形体具有内在的向心性，所以它们享有点或圆所具有的自我向心性。作为与周边环境分离的独立结构，支配着空间中的一个点，或占据某一限定区域的中心，集中式是理想的形式。集中形式能够具体地表达神圣的或令人敬畏的场所以及纪念重要的人或事件。



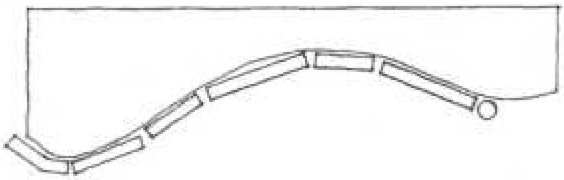
Yume-Dono, Eastern precinct of Horyu-Ji Temple, Nara, Japan, A.D. 607
梦殿，法隆寺东院，奈良，日本，607年





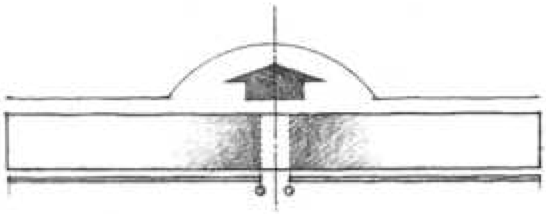
A linear form can result from a proportional change in a form's dimensions or the arrangement of a series of discrete forms along a line. In the latter case, the series of forms may be either repetitive or dissimilar in nature and organized by a separate and distinct element such as a wall or path.

线式形式可以来自某一形体量度比例的改变或沿一条直线布置一系列离散的形体。在后一种情况下，这一系列的形体或者是重复的，或者是本质不同却通过一个独立的、而且不同的要素，如一面墙或一条路来组织在一起。



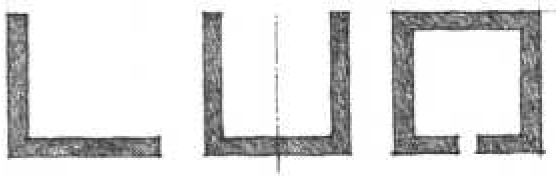
- A linear form can be segmented or curvilinear to respond to topography, vegetation, views, or other features of a site.

  线式形式可以是断续的或弯曲的，以适应基地的地形、植被、景观或其他特征。



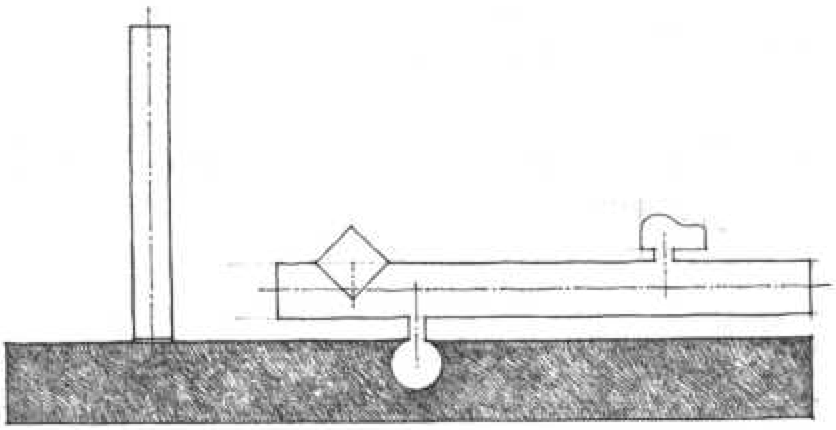
- A linear form can front on or define an edge of an exterior space, or define a plane of entry into the spaces behind it.

  线式形式可以形成外部空间的立面或限定外部空间的边缘，还能形成一个入口层面，以进入后面的空间。



- A linear form can be manipulated to enclose a portion of space.

  线式形式可以用来围合一部分空间。

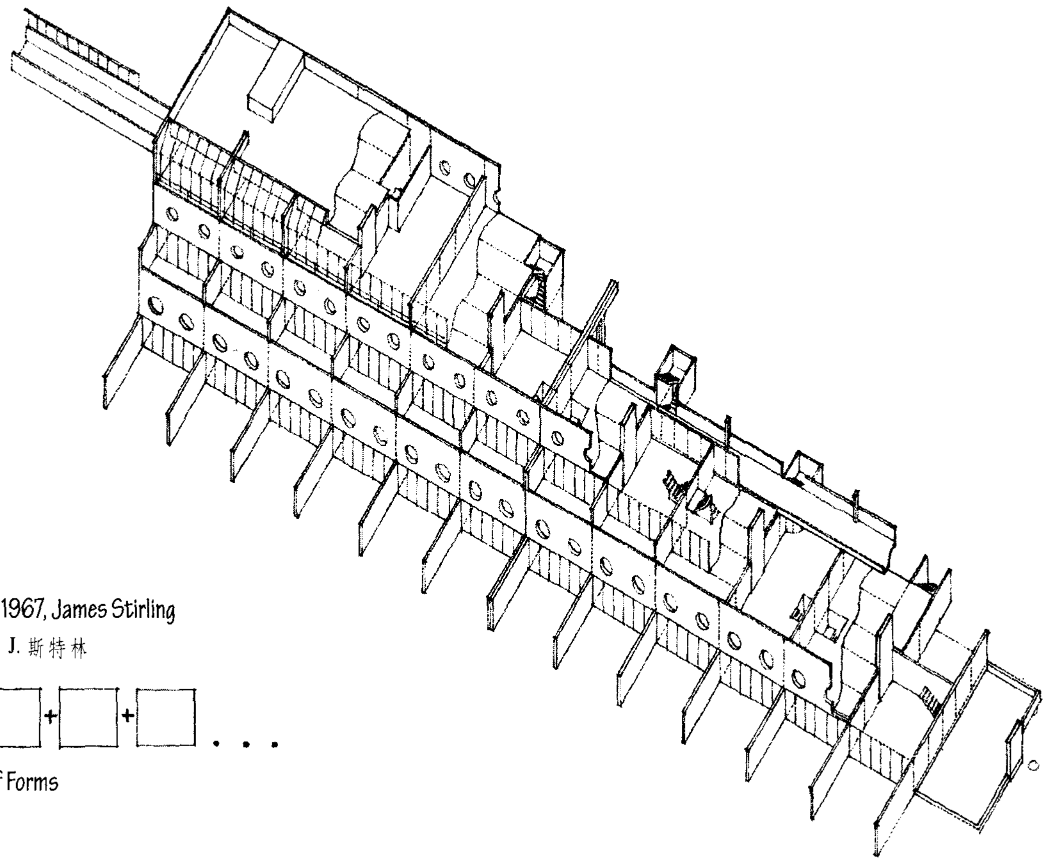


- A linear form can be oriented vertically as a tower element to establish or denote a point in space.

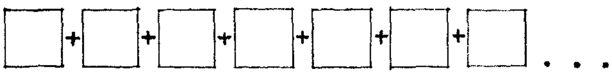
  线式形式可以竖向伸展，成为一个塔式要素，建立或标识空间中的一个点。

- A linear form can serve as an organizing element to which a variety of secondary forms are attached.

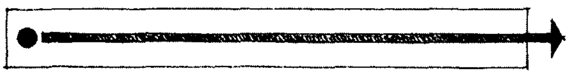
  线式形式可以作为一个组织要素，各种从属形式附着其上。



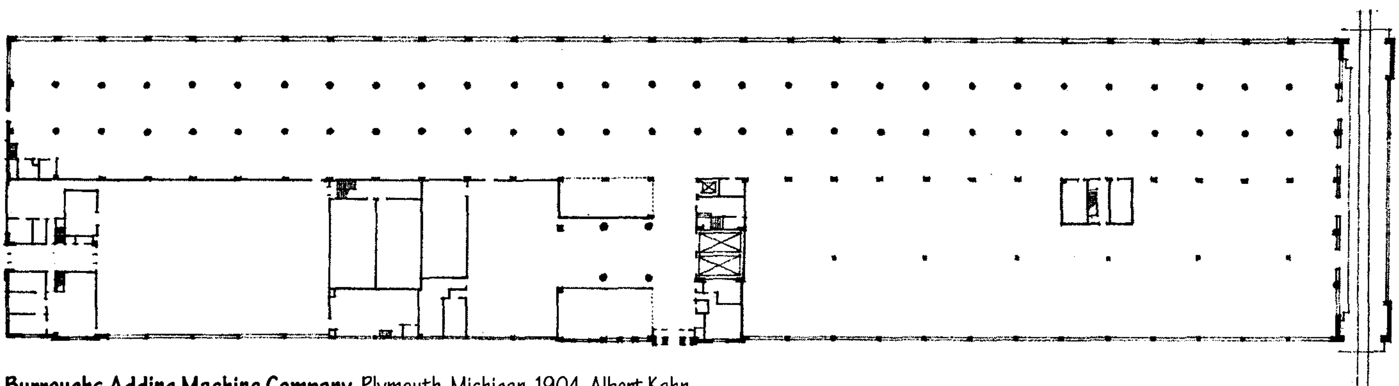
Runcorn New Town Housing, England,1967, James Stirling
兰柯恩新城住宅，英格兰，1967年，J. 斯特林



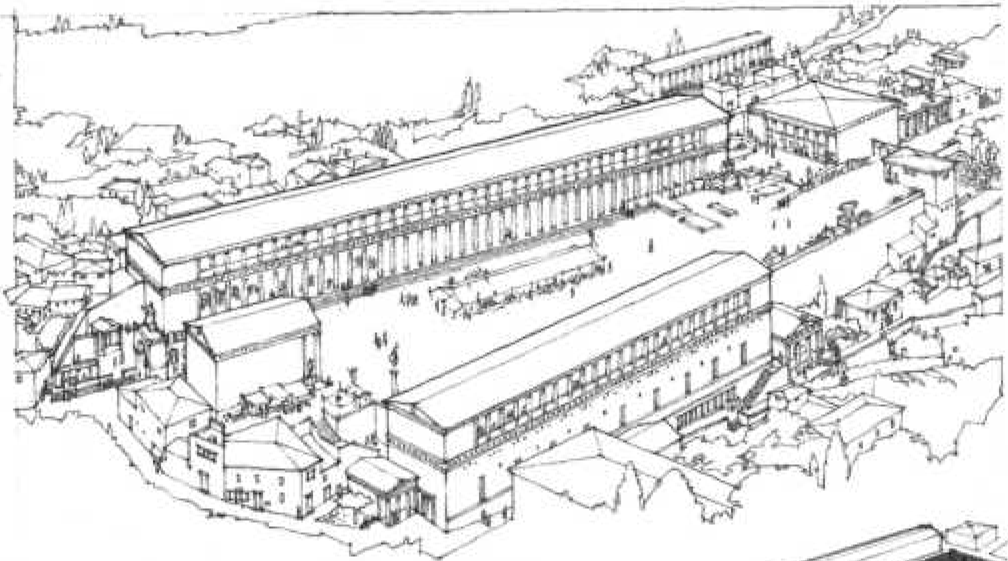
Linear Growth through the Repetition of Forms
通过形式的重复而成线式增长



Linear Form Expressing Procession or Movement
线式形式表达过程和运动

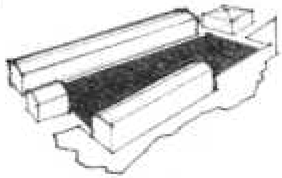


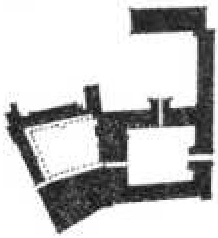
Burroughs Adding Machine Company, Plymouth, Michigan, 1904, Albert Kahn
巴勒斯计算器公司，普利茅斯，密歇根州，1904年，A. 康



Agora of Assos, Asia Minor, 2nd Century B.C.

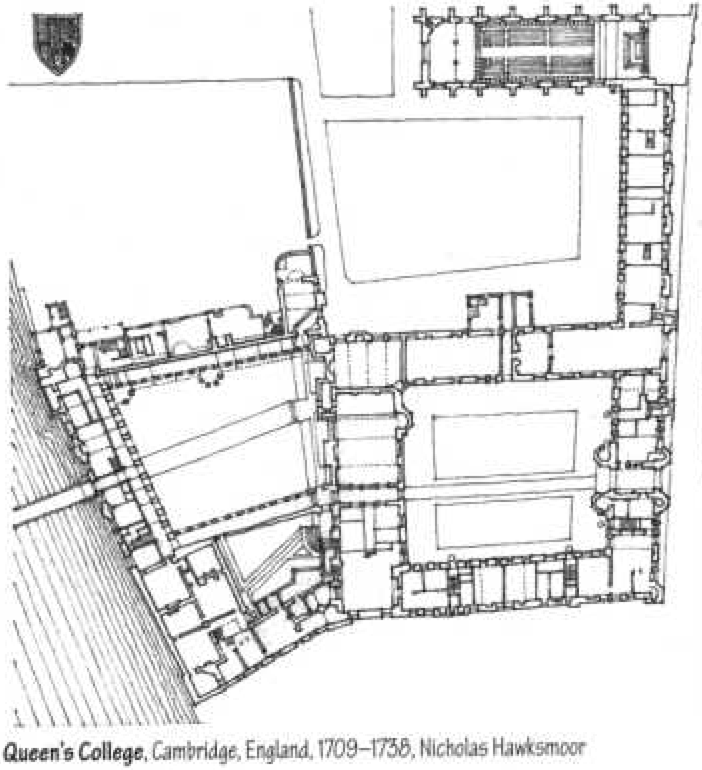
阿索斯的广场，小亚细亚，公元前2世纪





Linear Forms Fronting on or Defining Exterior Space

线式形式朝向或者限定外部空间



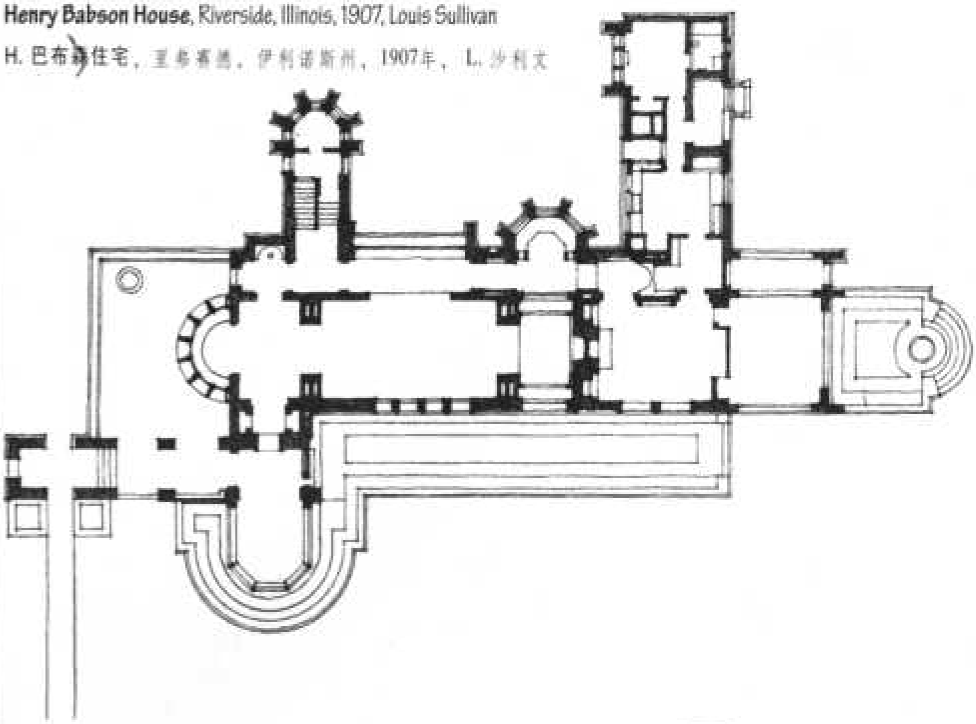
Queen's College, Cambridge, England, 1709–1738, Nicholas Hawksmoor

女王学院，剑桥，英格兰，1709年—1738年，N. 霍克斯莫尔

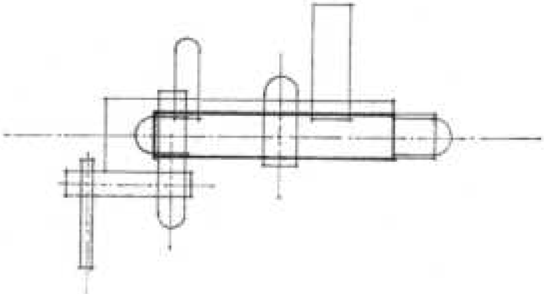


18th-century buildings fronting a tree-lined canal in Kampen, Holland

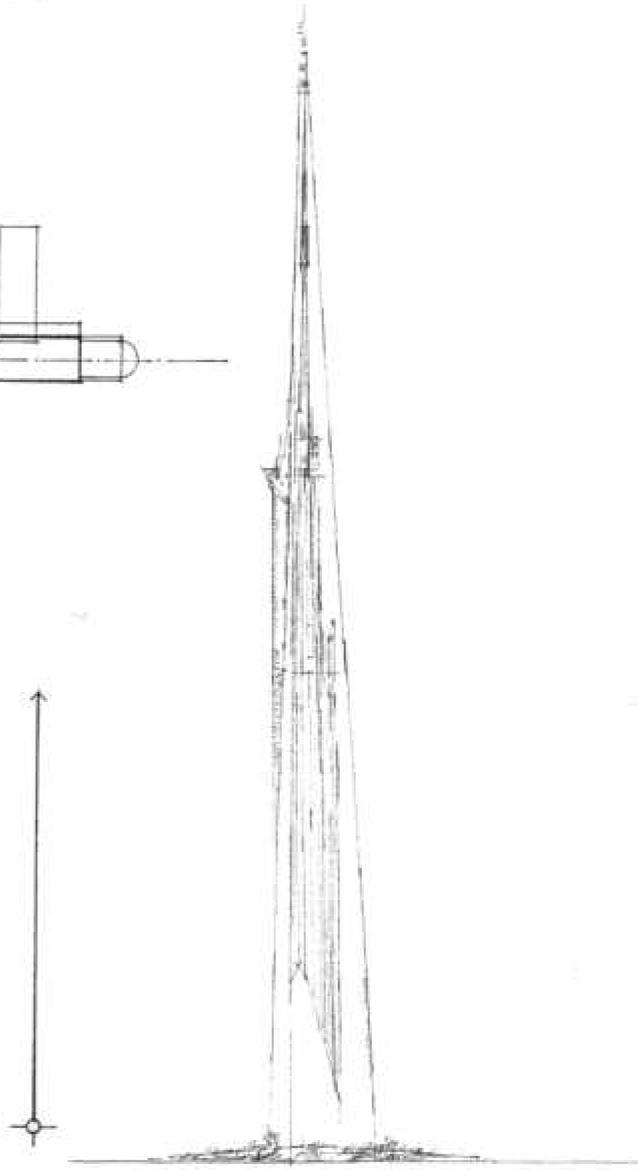
荷兰坎彭18世纪的建筑，面对绿树成行的运河



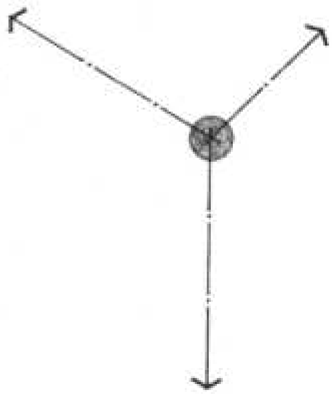
Henry Babson House, Riverside, Illinois, 1907, Louis Sullivan
H. 巴布森住宅，里弗赛德，伊利诺斯州，1907年，L. 沙利文



Linear Organizations of Space
线式空间组合

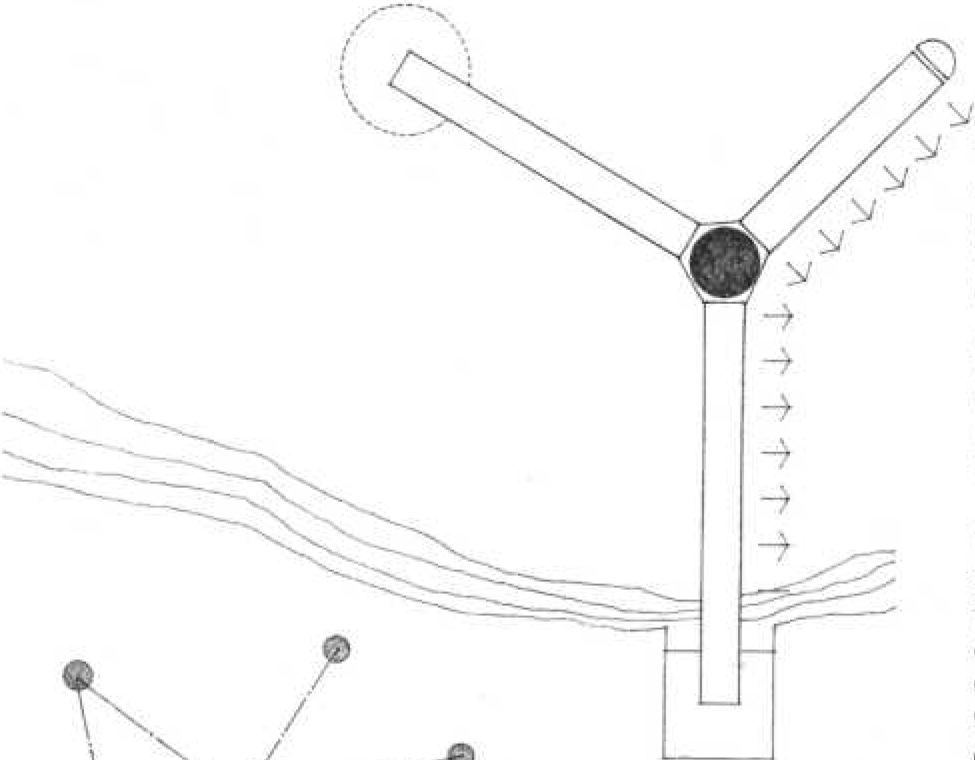


The Mile-high Illinois, Skyscraper Project, Chicago, Illinois, 1956, Frank Lloyd Wright
伊利诺斯米尔亥，摩天楼方案，芝加哥，伊利诺斯州，1956年，F. L. 莱特



A radial form consists of linear forms that extend outward from a centrally located core element in a radiating manner. It combines the aspects of centrality and linearity into a single composition.

放射形式包括多个线式形式，这些线式形式从居于中心位置的核心要素，以放射状的方式向外伸展。这种形式结合了集中性和线式的特点，形成独特的构图。

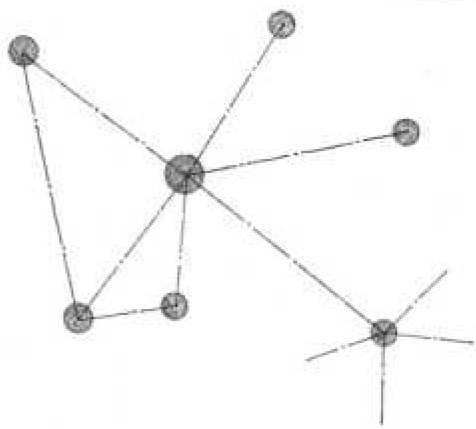


The core is either the symbolic or functional center of the organization. Its central position can be articulated with a visually dominant form, or it can merge with and become subservient to the radiating arms.

放射形式的核心，可以是一个象征性的组合中心，也可以是一个功能性的组合中心。其中心的位置，可以表现为在视觉上占主导地位的形式，或者与放射状的翼部结合变成它的附属部分。

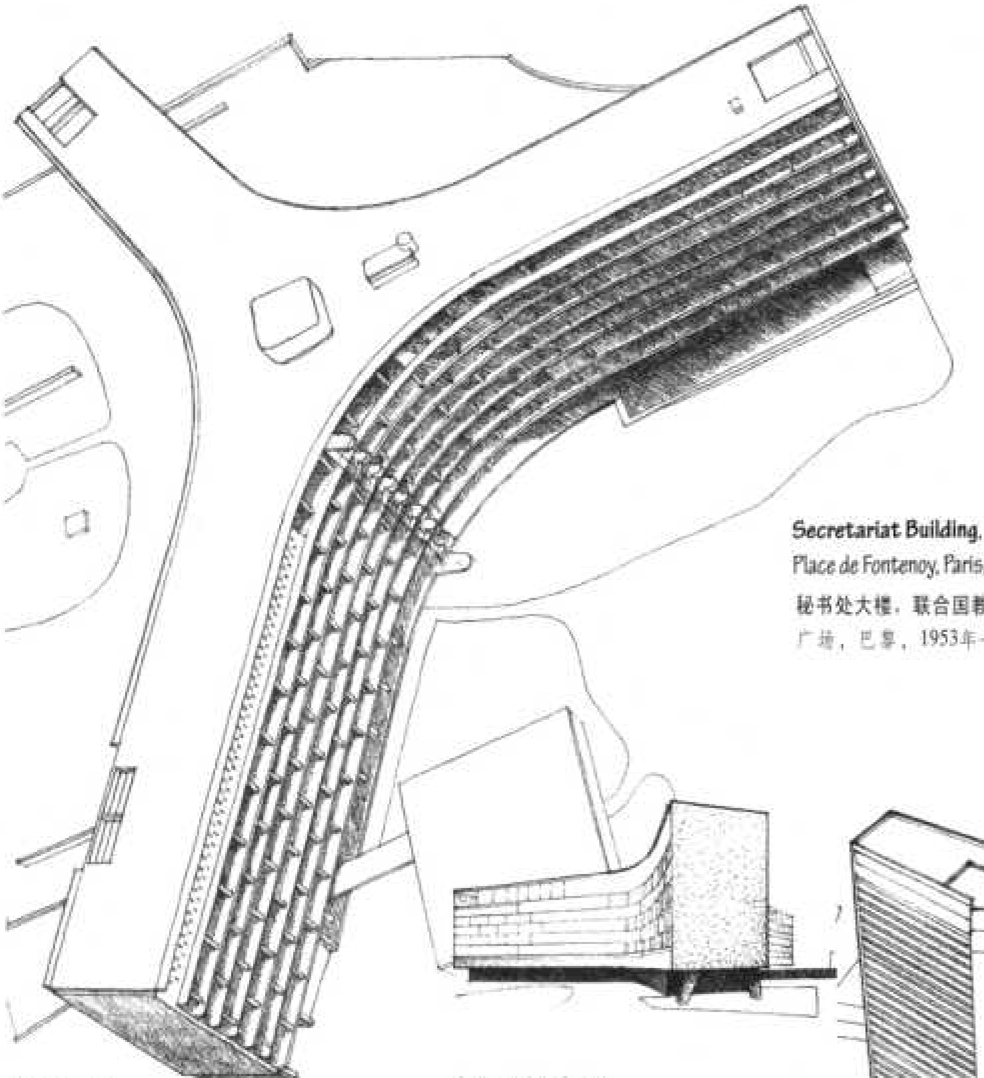
The radiating arms, having properties similar to those of linear forms, give a radial form its extroverted nature. They can reach out and relate to or attach themselves to specific features of a site. They can expose their elongated surfaces to desirable conditions of sun, wind, view, or space.

放射状的翼部，具有与线式形式类似的属性，使放射状形式呈现出外向的特征。这些翼部可以伸展出去，并使自身与基地的特定面貌发生关系，或依附于该基地。长长的外表面可朝向必需的日照、风向、景观或者空间等条件。



Radial forms can grow into a network of centers linked by linear arms.

放射形式可以发展成一个网络，在网络中，几个中心被线式翼部连在一起。



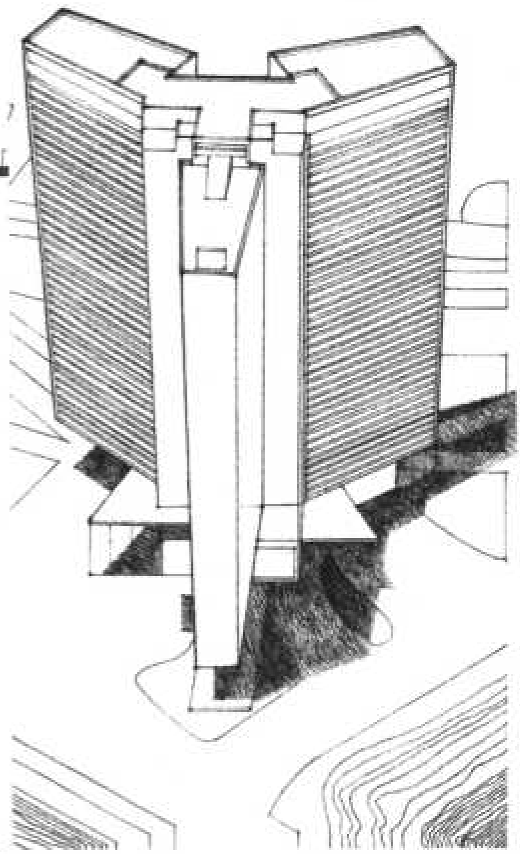
Aerial view
俯视图

Ground-level view
平视图

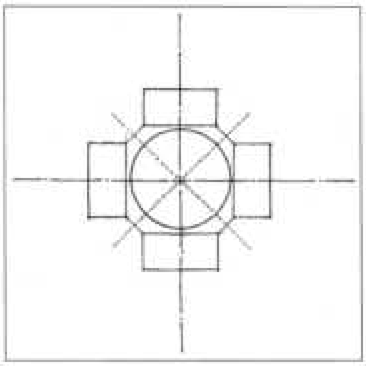
Secretariat Building, UNESCO Headquarters, Place de Fontenoy, Paris, 1953–1958, Marcel Breuer
秘书处大楼，联合国教科文组织总部，丰特诺依广场，巴黎，1953年—1958年，M. 布鲁尔

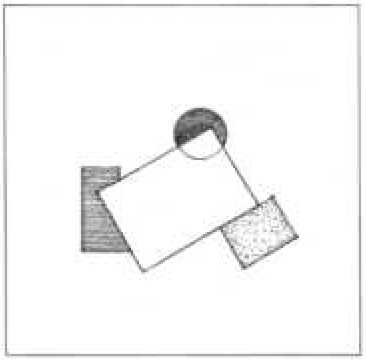
The organization of a radial form can best be seen and understood from an aerial viewpoint. When viewed from ground level, its central core element may not be clearly visible and the radiating pattern of its linear arms may be obscured or distorted through perspective foreshortening.

鸟瞰放射状形式的组合，可以看得最清楚，理解得最透彻。平视放射状形式时，由于透视的遮挡，其核心要素可能难以清楚地看到，线式翼部的放射状图案也可能是含糊不清或失真变形的。



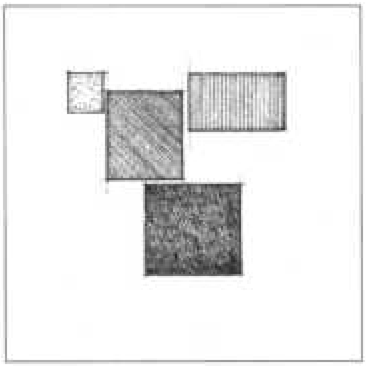
Skyscraper by the Sea, Project for Algiers, 1938, Le Corbusier
海滨摩天楼，为阿尔及尔做的方案，1938年，勒·柯布西埃

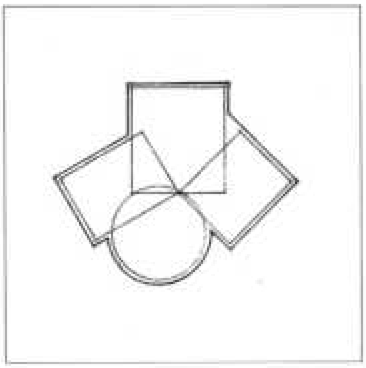




While a centralized organization has a strong geometric basis for the ordering of its forms, a clustered organization groups its forms according to functional requirements of size, shape, or proximity. While it lacks the geometric regularity and introverted nature of centralized forms, a clustered organization is flexible enough to incorporate forms of various shapes, sizes, and orientations into its structure.

集中式组合在排列其形体时有一种强有力的几何基础，而组团式组合则依据规模、形状或相似性等功能要求来组织其形体。组团式虽然没有集中式的几何规则和内向性，但具有足够的灵活性，可以把各种形状、各种尺寸以及各种方向的形体结合在它的结构中。



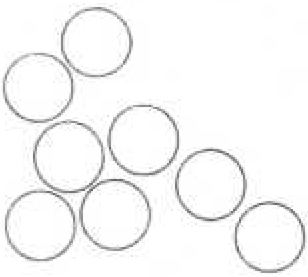


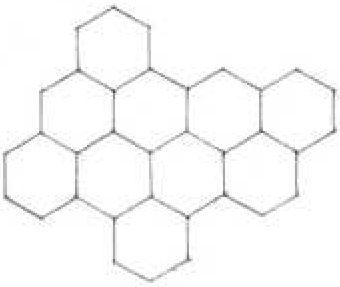
Considering their flexibility, clustered organizations of forms may be organized in the following ways:

- They can be attached as appendages to a larger parent form or space.
- They can be related by proximity alone to articulate and express their volumes as individual entities.
- They can interlock their volumes and merge into a single form having a variety of faces.

考虑到灵活性，形体的组团式组合可以按照以下方式组织：

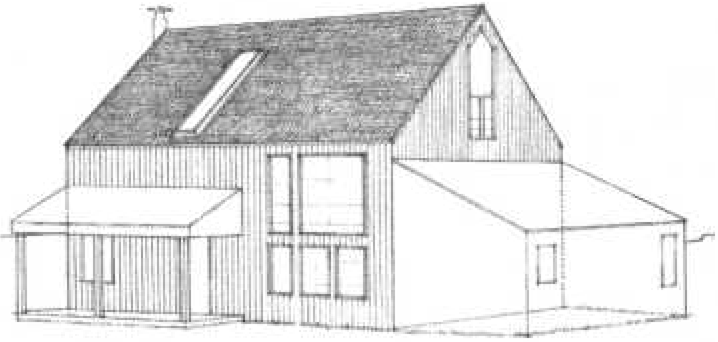
- 它们可以作为附属物依附于一个较大的母体形式或空间上。
- 它们可以只用相似性这一点而互相联系在一起，并把它们的容积清楚地表达为独特的实体。
- 它们的体量也可以彼此贯穿，合并成一个单独的、具有多种面貌的形体。





A clustered organization can also consist of forms that are generally equivalent in size, shape, and function. These forms are visually ordered into a coherent, nonhierarchical organization not only by their close proximity to one another, but also by the similarity of their visual properties.

组团式组合也可以由尺寸、形状和功能大体相同的形体组合而成。这些形体在视觉上排列成一个互相连贯、无等级的组合，这种组合不仅是各要素彼此接近，而且具有相似的视觉属性。

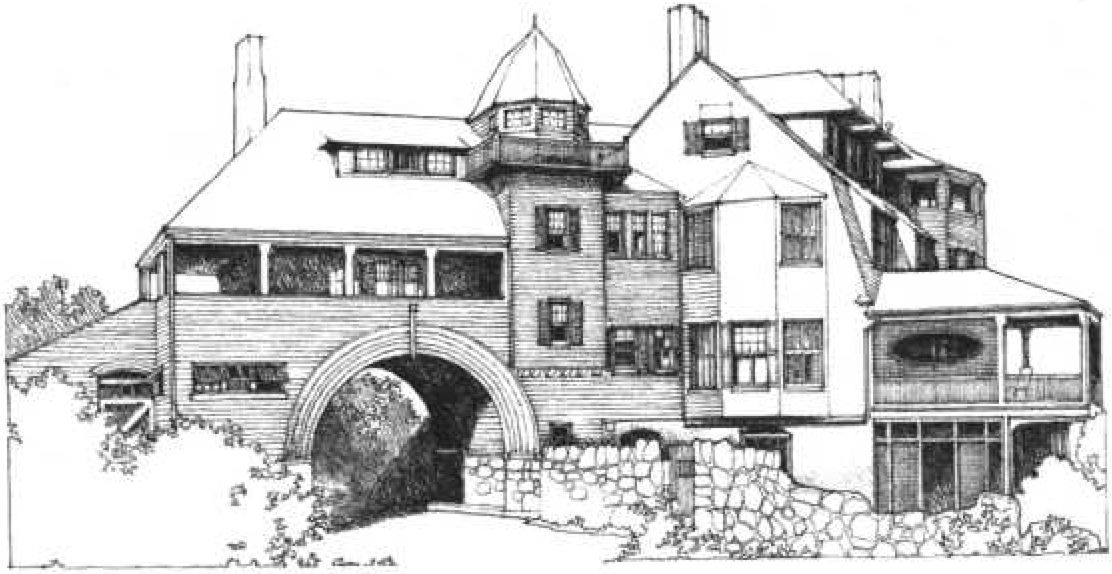


A Cluster of Forms Attached to a Parent Form:

Vacation House, Sea Ranch, California, 1968, MLTW/Moore & Turnbull

依附于母体上的形式组团：

假日别墅，瑞奇海滨，加利福尼亚州，1968年，MLTW/穆尔和特恩布尔

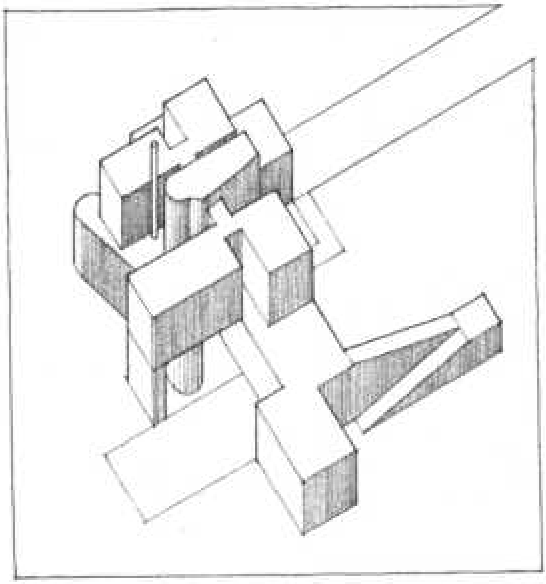


A Cluster of Interlocking Forms:

G.N. Black House (Kragsyde), Manchester-by-the Sea, Massachusetts, 1882–1883, Peabody & Stearns

互相贯穿形式的组团：

G.N.布莱克住宅（克拉格西迪），曼彻斯特海滨，马萨诸塞州，1882年—1883年，皮博迪和斯特恩斯



A Cluster of Articulated Forms:

House Study, 1956, James Stirling & James Gowan

连接形式的组团：

住宅研究，1956年，J.斯特林与J.高恩

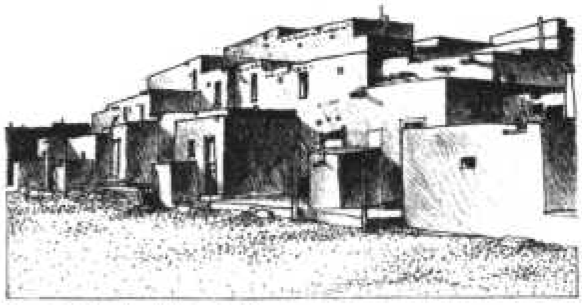


Trulli Village, Alberobello, Italy
Traditional dry-stone shelters in existence since the 17th century.

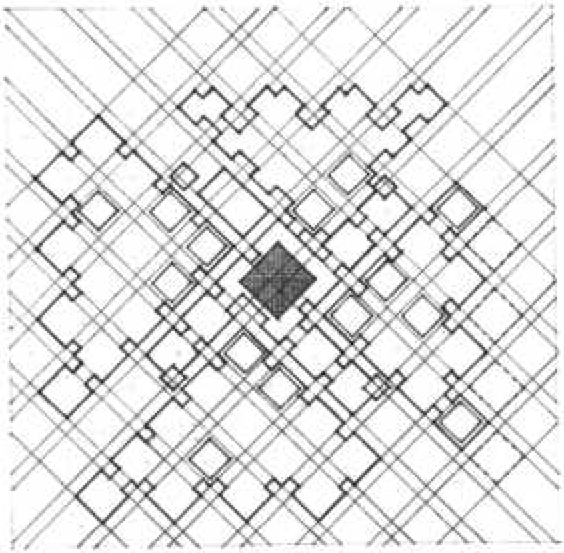
特鲁里村，奥伯罗贝洛，意大利
传统的，由石材干砌而成的房子，自从17世纪时就存在。

Numerous examples of clustered housing forms can be found in the vernacular architecture of various cultures. Even though each culture produced a unique style in response to differing technical, climatic, and sociocultural factors, these clustered housing organizations usually maintained the individuality of each unit and a moderate degree of diversity within the context of an ordered whole.

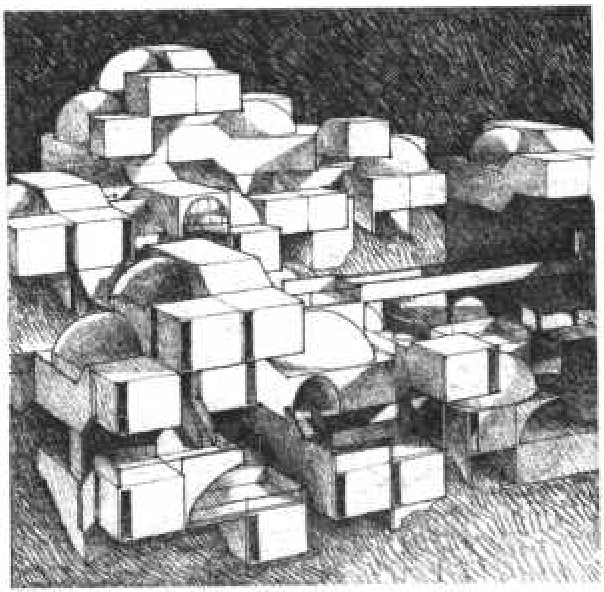
大量组团式住宅形体的实例可以在各种文化的乡土建筑中见到。即使每种文化都酝酿出一种独特的类型，以呼应不同的技术、气候和社会文化等因素，这些组团式的住宅组合通常保持着每种单元的独特性，并且在有序的整体环境中保持着适度的多样性。



Taos Pueblo, New Mexico, 13th century
陶斯·布埃布罗，新墨西哥州，13世纪



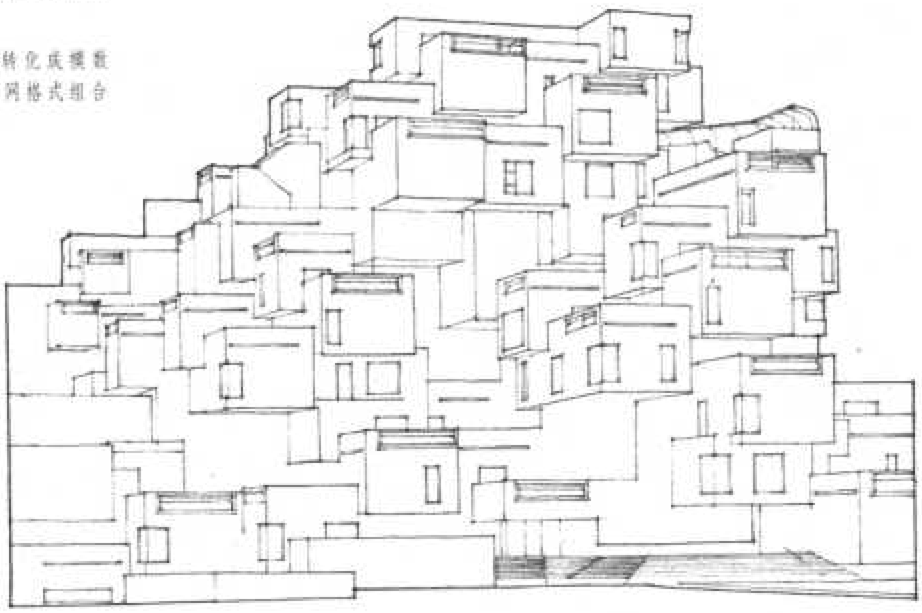
Centraal Beheer Office Building, Apeldoorn, The Netherlands, 1972, Herman Hertzberger with Lucas & Niemeyer
比希尔中心办公楼，阿珀顿，荷兰，1972年，H.赫茨伯格与卢卡斯和尼迈耶



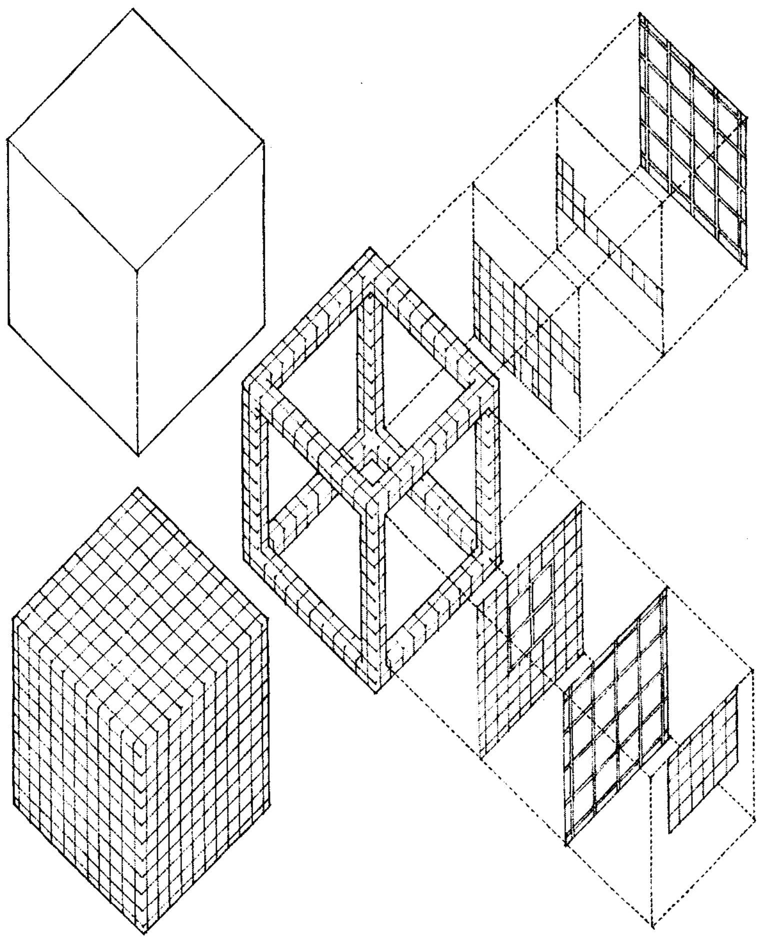
Habitat Israel, Jerusalem, 1969, Moshe Safdie
以色列住宅，耶路撒冷，1969年，M.萨夫迪

Vernacular examples of clustered forms can be readily transformed into modular, geometrically ordered compositions which are related to grid organizations of form.

组团式形体的乡土建筑实例，可以很容易地转化成模数化、具有几何秩序的构图，这种构图与形体的网格式组合相关。



Habitat Montreal, 1967, Moshe Safdie
蒙特利尔住宅，1967年，M.萨夫迪



Conceptual Diagram, *Gunma Prefectural Museum of Fine Arts*, Japan, 1974, Arata Isozaki
概念图解，群马地方美术博物馆，日本，1974年，矶崎新

A grid is a system of two or more intersecting sets of regularly spaced parallel lines. It generates a geometric pattern of regularly spaced points at the intersections of the grid lines and regularly shaped fields defined by the grid lines themselves.

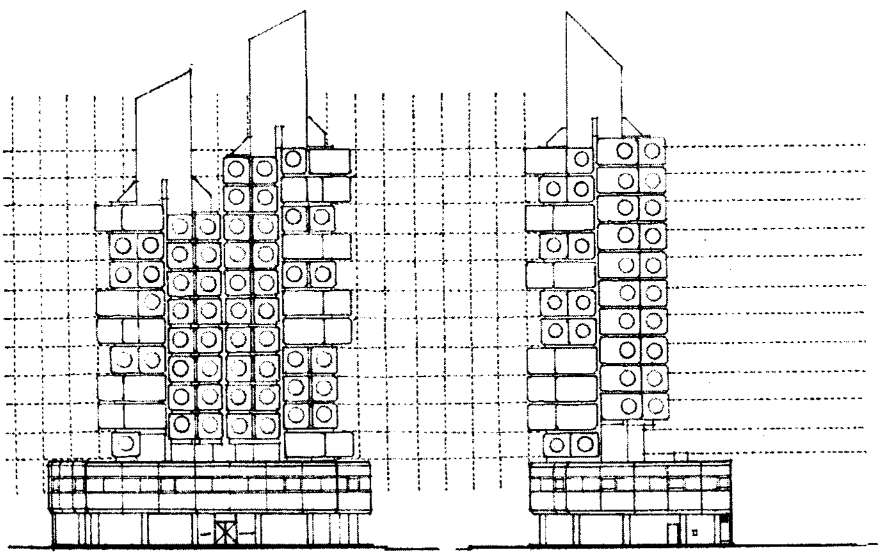
一副网格是由两组或多组等距平行线相交而成的系统。它产生的是一个几何图案。这个几何图案由间距规则的点和形状规则的区域构成，其中间距规则的点位于网格直线的相交处，而规则的形状则是由网格中的直线所限定的。

The most common grid is based on the geometry of the square. Because of the equality of its dimensions and its bilateral symmetry, a square grid is essentially nonhierarchical and nondirectional. It can be used to break the scale of a surface down into measurable units and give it an even texture. It can be used to wrap several surfaces of a form and unify them with its repetitive and pervasive geometry.

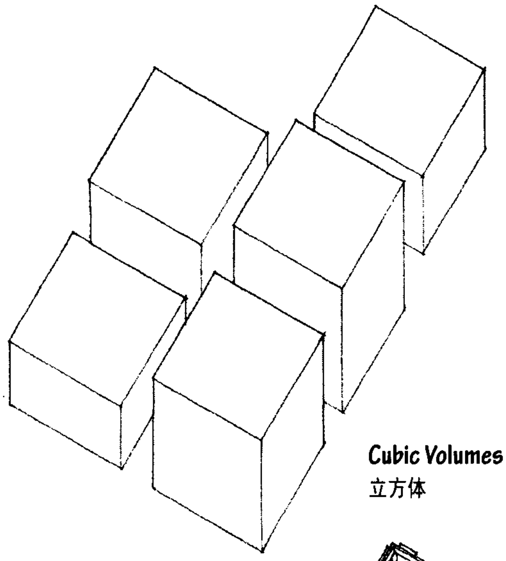
最常见的网格，是以几何方形为基础的。因为它的几个量度相等，两个方向对称，所以一个正方形的网格基本上是无等级、无方向的。网格可以用来细分一个表面的尺度，使之布满可以度量的单位，并使该表面具有均匀的质感。网格可以用来围起一个形体的几个表面，并以重复的、漫布的几何形状使这些表面得到统一。

The square grid, when projected into the third dimension, generates a spatial network of reference points and lines. Within this modular framework, any number of forms and spaces can be visually organized.

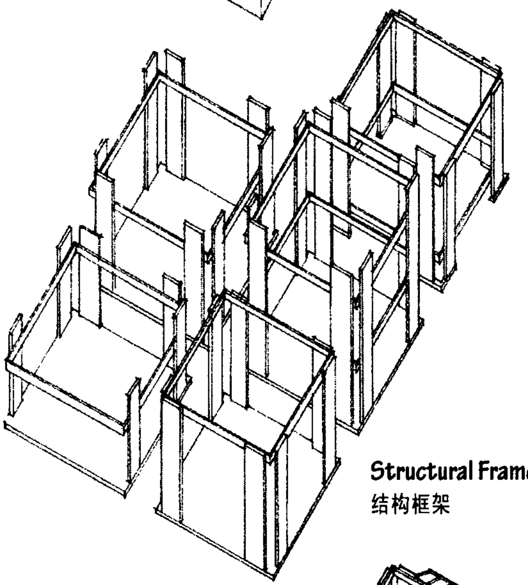
当正方形的网格向第三度方向伸展时，就产生了具有参照点和线的空间网络。在这个模数化的空间网架里，任何数量的形体和空间都可以从视觉上组织起来。



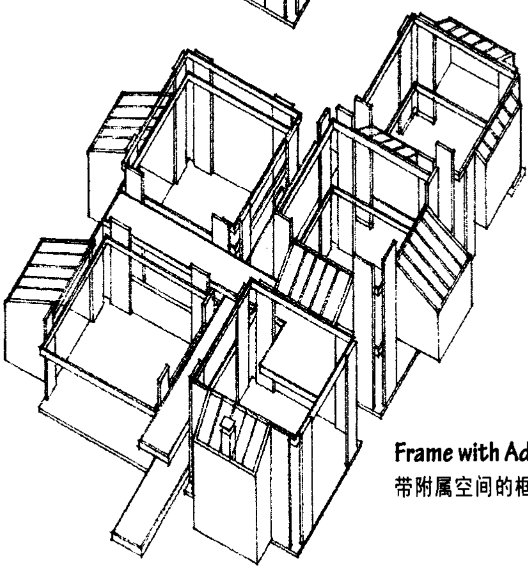
Nakagin Capsule Building, Tokyo, 1972, Kisho Kurokawa
中银舱体大厦，东京，1972年，黑川纪章



Cubic Volumes
立方体

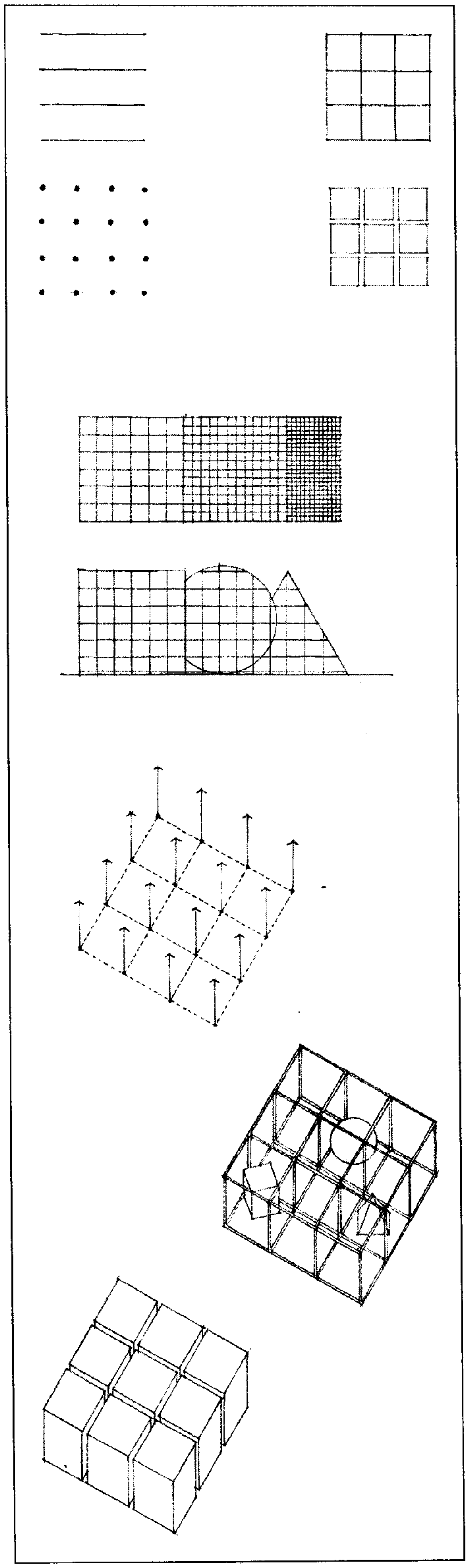


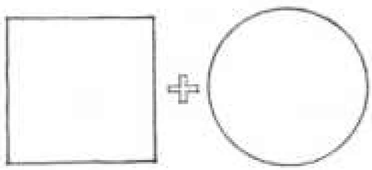
Structural Frame
结构框架



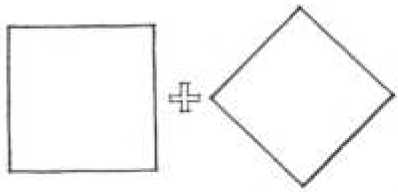
Frame with Adjacent Spaces
带附属空间的框架

Hattenbach Residence, Santa Monica, California, 1971–1973, Raymond Kappe
海滕巴奇住宅，圣莫尼卡，加利福尼亚州，1971年—1973年，R. 卡普





Circle and Square
圆与方



Rotated Grid
旋转的网格

When two forms differing in geometry or orientation collide and interpenetrate each other's boundaries, each will vie for visual supremacy and dominance. In these situations, the following forms can evolve.

当几何形式不同或方位不同的两个形体，彼此的边界互相碰撞和相互贯穿的时候，每个形体都将争夺视觉上的优势和主导地位。在这种情况下，可演化出下列形式。



- The two forms can subvert their individual identities and merge to create a new composite form.

  两个形体可能失去它们各自的特性，合并在一起产生一个新的复合形体。



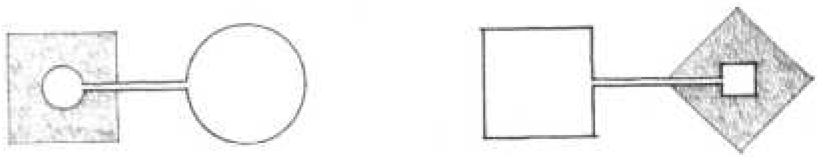
- One of the two forms can receive the other totally within its volume.

  其中一个形体可以将另外一个完全包容在其容积之内。



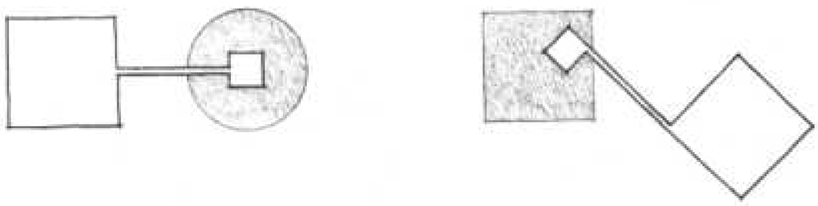
- The two forms can retain their individual identities and share the interlocking portion of their volumes.

  两个形体均能保持各自的特点，并且共享容积相交的部分。



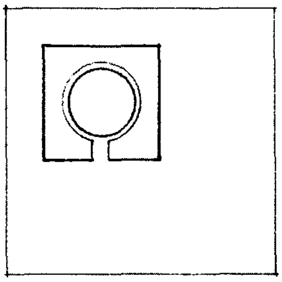
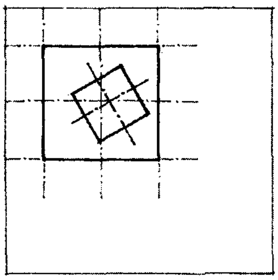
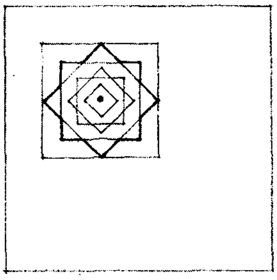
- The two forms can separate and be linked by a third element that recalls the geometry of one of the original forms.

  两个形体可以彼此分离，通过第三个要素相连，该要素应当具有其中一个形体的几何特征。



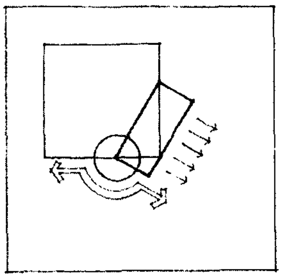
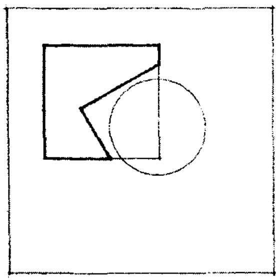
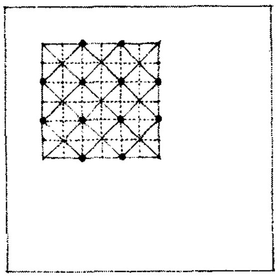
Forms differing in geometry or orientation may be incorporated into a single organization for any of the following reasons:

几何形式不同或方位不同的形体，可以由于下列原因之一，结合成一个单独的组合体：

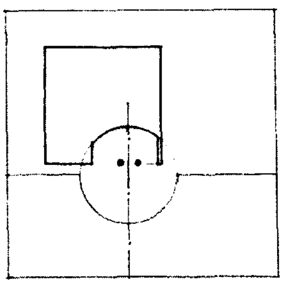
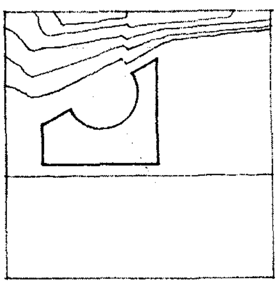
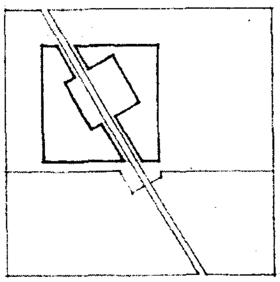
- To accommodate or accentuate the differing requirements of interior space and exterior form
- To express the functional or symbolic importance of a form or space within its context
- To generate a composite form that incorporates the contrasting geometries into its centralized organization

- 为了适应或强调内部空间或外部形体的不同需要
- 为了表达一个形体或一个空间在其背景中所具有的功能意义或象征意义
- 为了产生一个复合形体，把互相对立的几何形式结合成该复合形体的集中式组合

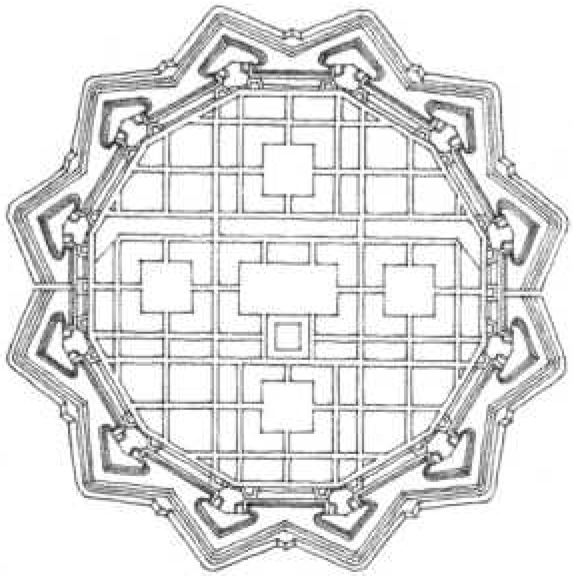
- To inflect a space toward a specific feature of a building site
- To carve a well-defined volume of space from a building form
- To express and articulate the various constructional or mechanical systems that exist within a building form

- 为了适应建筑基地的特定面貌而改变空间
- 为了从某一建筑形体上切出一块界限明显的空间体量
- 为了清晰地表现建筑形体内部的各种结构或机械系统

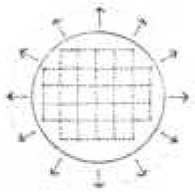
- To reinforce a local condition of symmetry in a building form
- To respond to contrasting geometries of the topography, vegetation, boundaries, or existing structures of a site
- To acknowledge an already existing path of movement through a building site

- 为了在一个建筑形体中强调局部对称的情况
- 为了呼应地形、植被、边界或现存基地结构中所具有的对立的几何特征
- 为了确认一条已经存在的、穿越建筑基地的运动轨迹

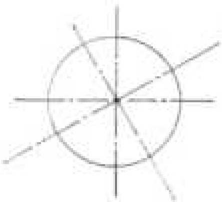


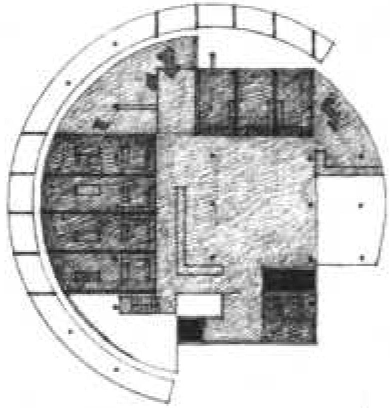
Plan for an Ideal City, 1615, *Vincenzo Scamozzi*
理想城市平面，1615年，V.斯卡莫齐

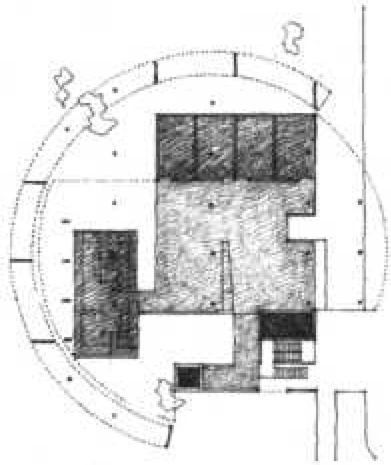
A circular form can be freestanding in its context to express its ideal shape and still incorporate a more functional, rectilinear geometry within its boundaries.
一个圆的形体可以独立于其环境中，表现其理想的形状，但仍能在它的边界之内与一个更具功能性，直线式的几何形体结合起来。



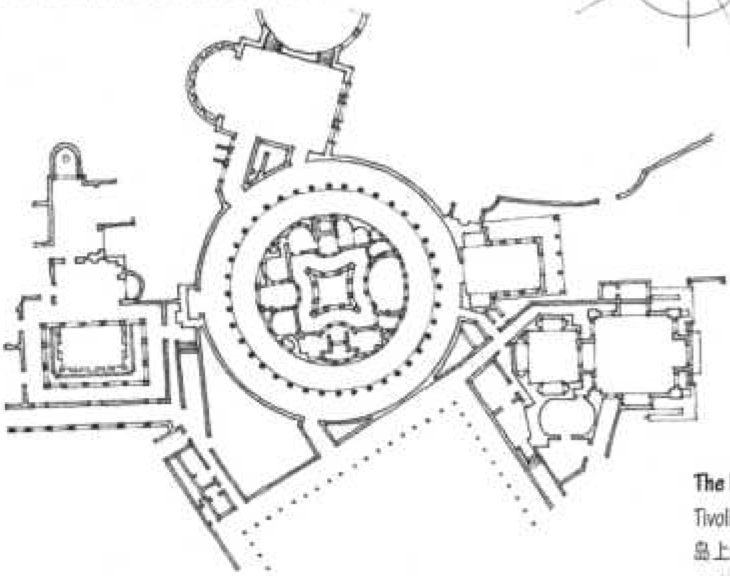
The centrality of a circular form enables it to act as a hub and unify forms of contrasting geometry or orientation about itself.
圆形形体的向心性使其能够成为一个轴心，使几何形状或方位对立的形体在它的周围得到统一。



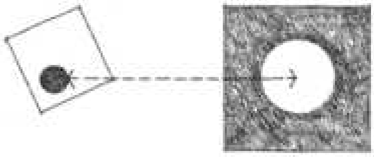


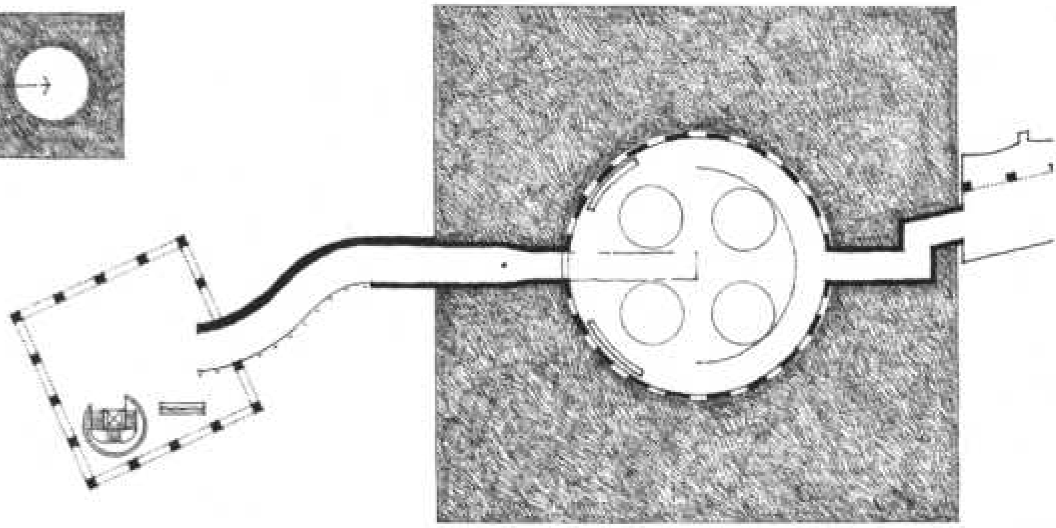


Chancellery Building, French Embassy, Brasilia, 1964–1965, *Le Corbusier*
领事馆大楼，法国大使馆，巴西利亚，1964年—1965年，勒·柯布西埃



The Island Villa (Teatro Marittimo), Hadrian's Villa, Tivoli, Italy, A.D. 118–125
岛上别墅（T.马里蒂莫），哈德良别墅，提沃利，意大利，118年—125年



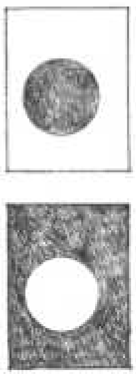


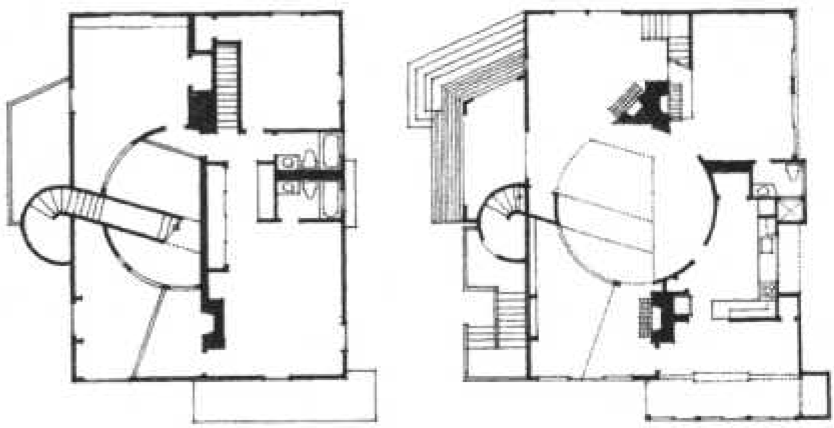
Museum for North Rhine–Westphalia, Dusseldorf, Germany, 1975, James Stirling & Michael Wilford

为北莱茵—威斯特伐利亚设计的博物馆，杜塞尔多夫，德国，1975年，J. 斯特林与M. 威尔福德

A circular or cylindrical space can serve to organize the spaces within a rectangular enclosure.

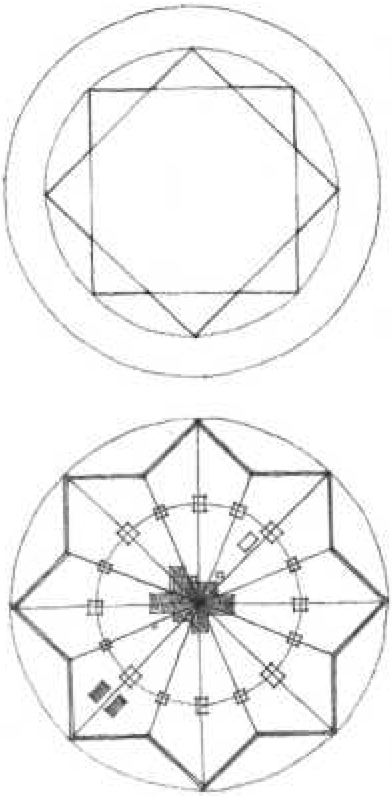
一个圆形或圆柱形的空间可以用来在一个矩形的围护结构内组织空间。



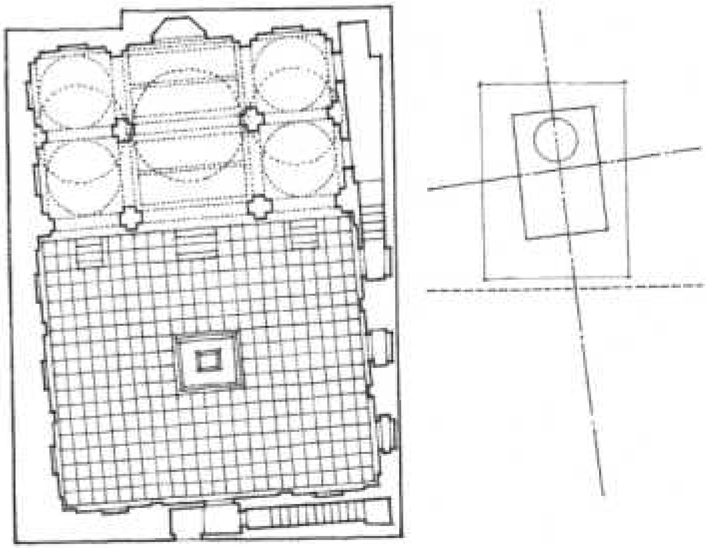


Murray House, *Cambridge*, Massachusetts, 1969, MLTW/Moore-Turnbull

默里住宅，剑桥，马萨诸塞州，1969年，MLTW/穆尔和特恩布尔

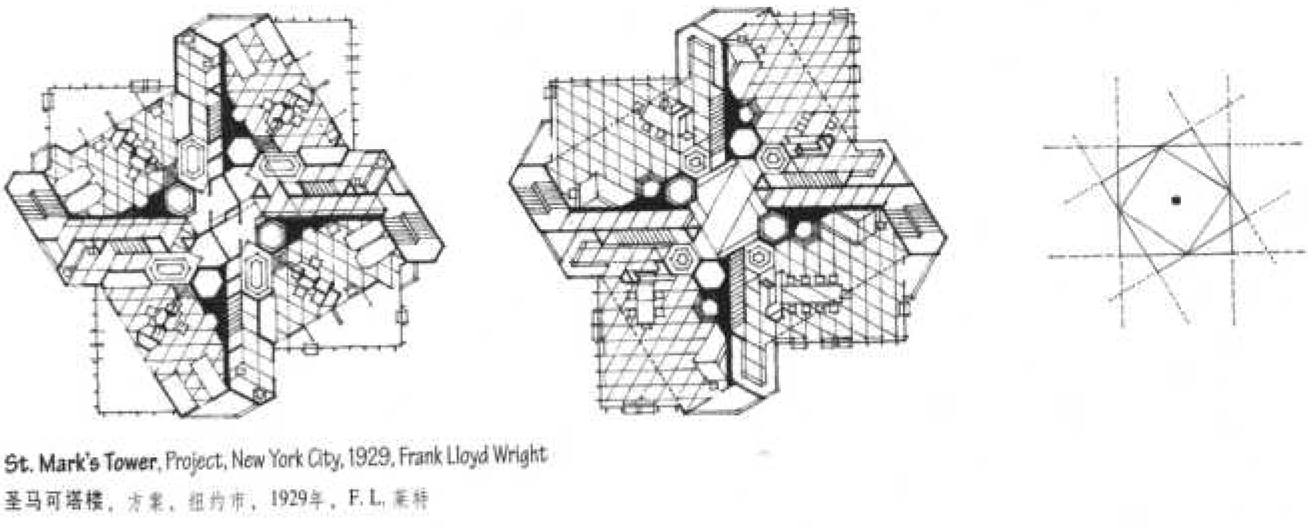


Plan of the Ideal City of Sforzinda, 1464, Antonio Filarete
为斯弗琴达所做的理想城市平面，1464年，A.菲拉特

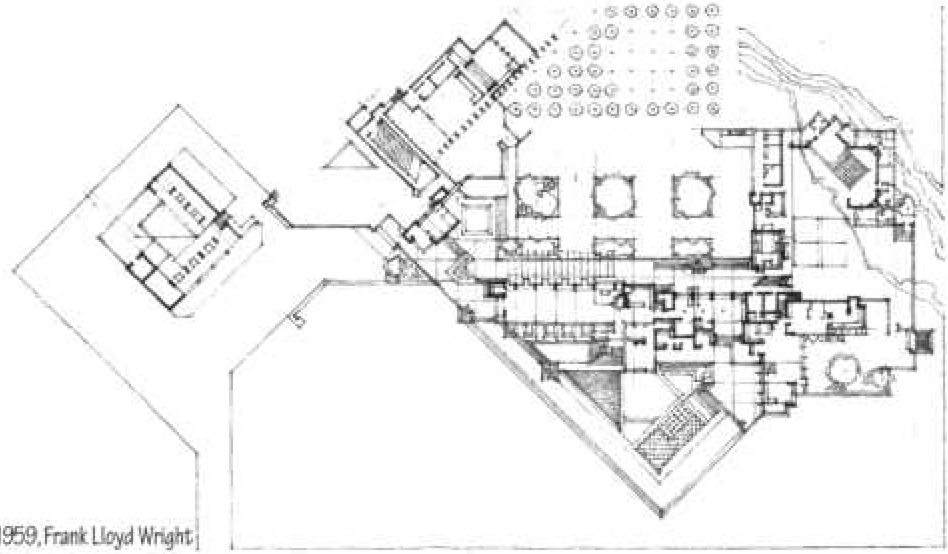


Pearl Mosque, within the Red Fort, an imperial palace at Agra, India, 1658–1707, Aurangzib.
The interior space of this mosque is oriented exactly with the cardinal points while its exterior conforms to the existing layout of the fort.

珍珠清真寺，在红堡内，阿格拉的一座皇宫，印度，1658年—1707年，奥兰齐布
这座清真寺的内部严格按照教义确定方向，而其外部却遵从城堡现存的环境。

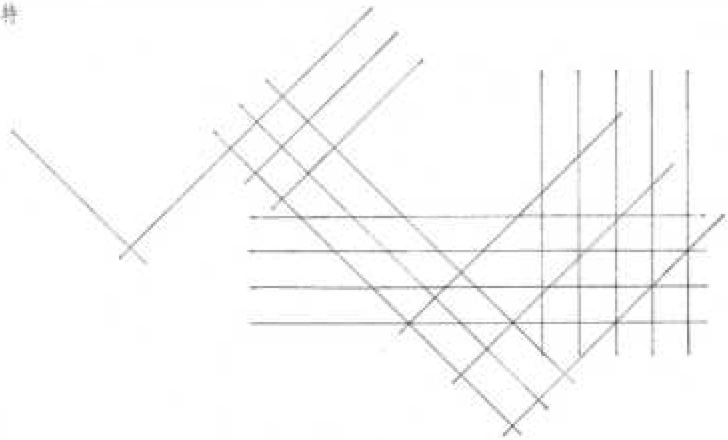


St. Mark's Tower, Project, New York City, 1929, Frank Lloyd Wright
圣马可塔楼，方案，纽约市，1929年，F. L. 莱特



A Diagram of Architecture:
建筑图解：

Taliesin West, near Scottsdale, Arizona, 1938–1959, Frank Lloyd Wright
西塔里埃森，斯科茨代尔附近，亚利桑那州，1938年—1959年，F. L. 莱特



A *diagram* by Bernhard Hoesli *of the geometry regulating the* layout of Taliesin West
由B. 赫斯利所做的，控制西塔里埃森布局的几何简图

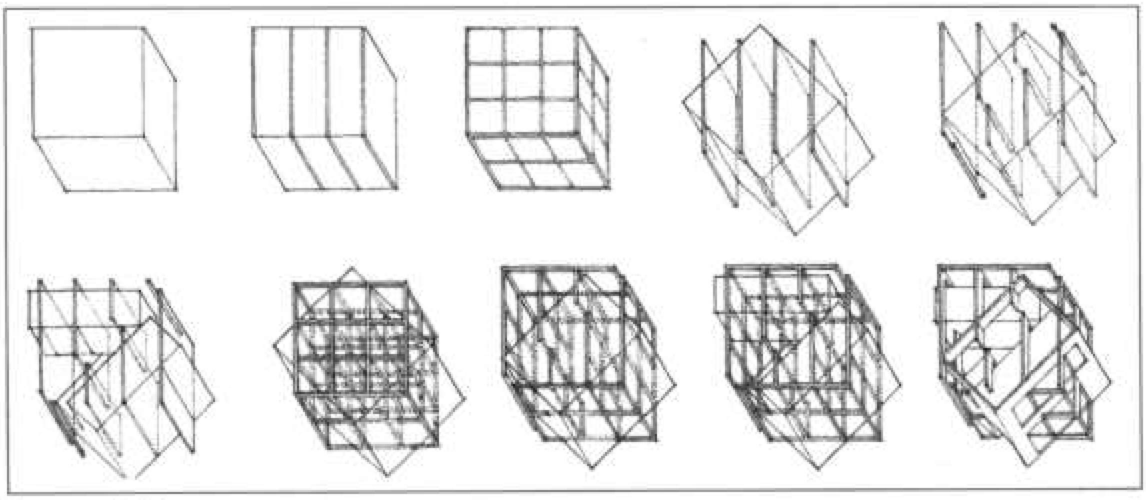
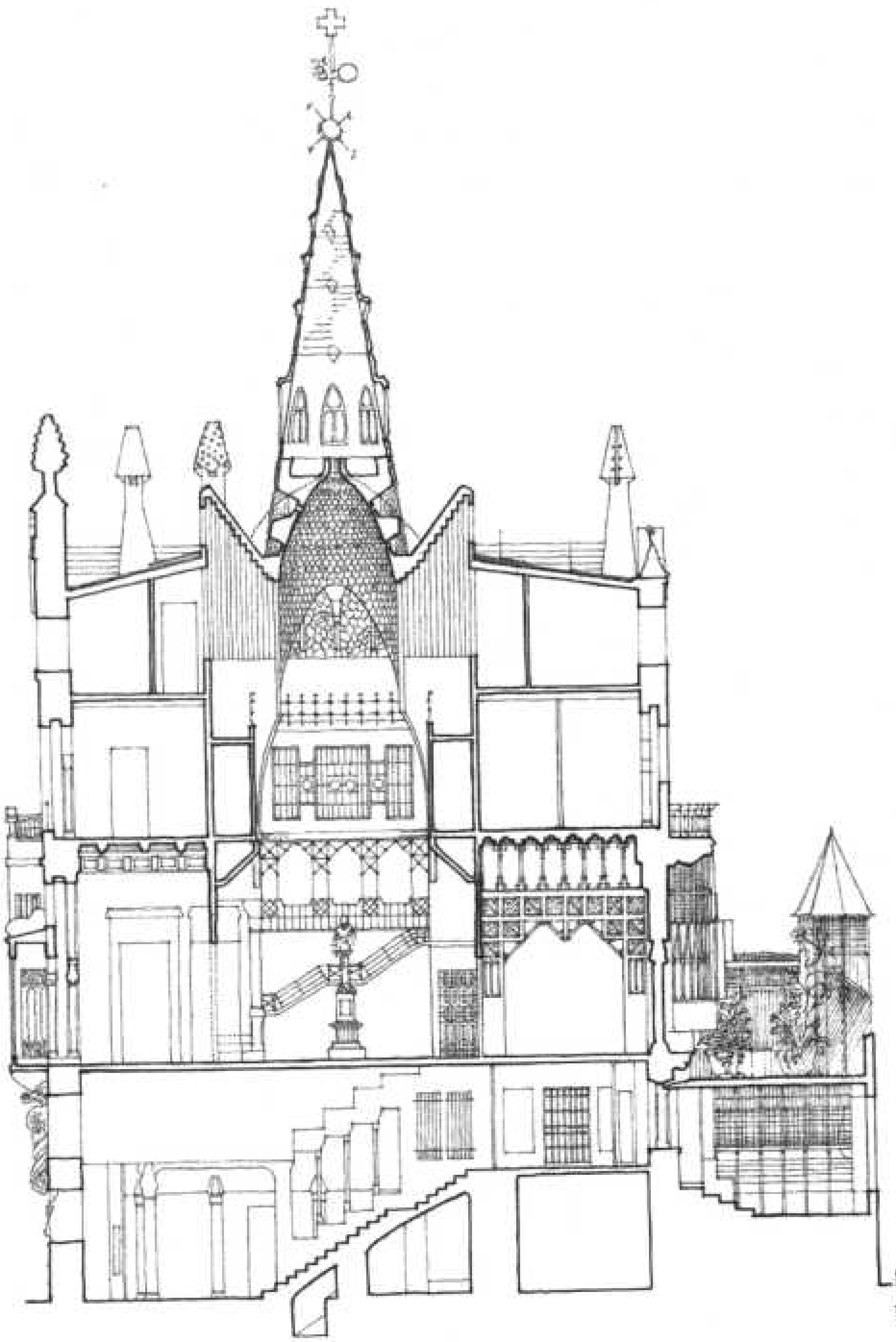
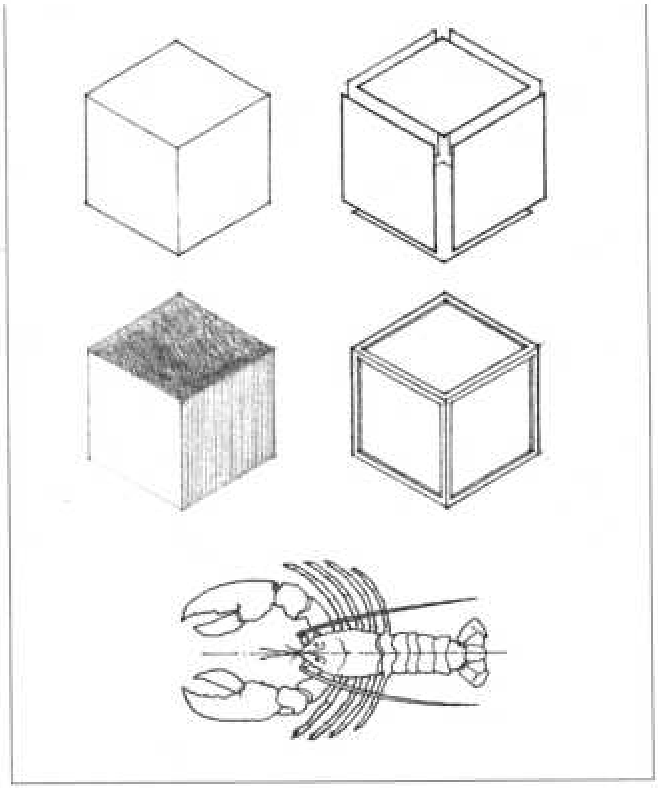
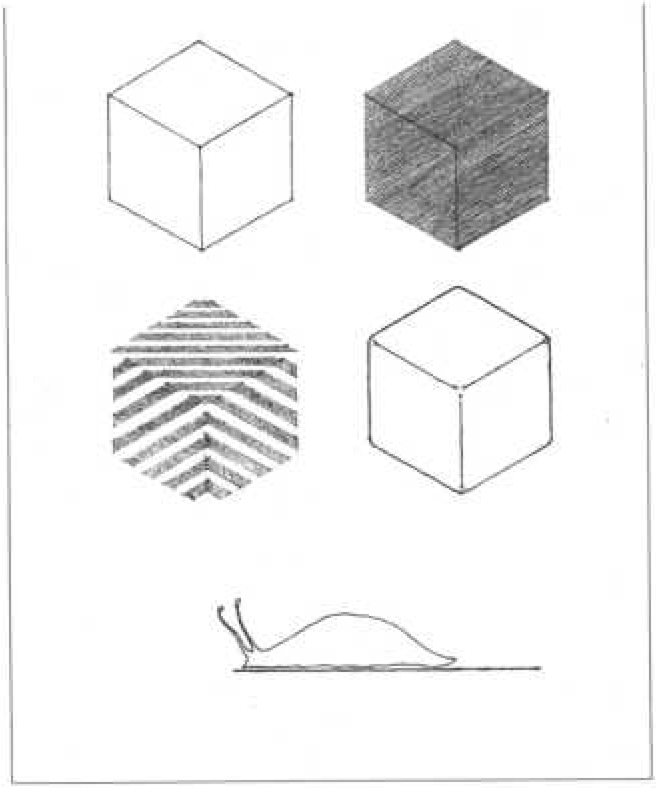


Diagram as Architecture:
随建筑进展的图解：
House III for Robert Miller, Lakeville, Connecticut, 1971, Design Development Drawings, Peter Eisenman
为R. 米勒所做的三号住宅，莱克维里，康涅狄格州，1971年，设计进展简图，P. 埃森曼



Palacio Güell, Barcelona, 1885–1889, Antonio Gaudi
吉尔大厦，巴塞罗那，1885年—1889年，A. 高迪





Articulation refers to the manner in which the surfaces of a form come together to define its shape and volume. An articulated form clearly reveals the precise nature of its parts and their relationships to each other and to the whole. Its surfaces appear as discrete planes with distinct shapes and their overall configuration is legible and easily perceived. In a similar manner, an articulated group of forms accentuates the joints between the constituent parts in order to visually express their individuality.

接合是指把一个形体的几个表面组合起来以确定其形状或容积的手法。一个接合良好的形体，能够清晰地反映出各个组成部分的精确特性、彼此之间的关系以及每个部分与整体的关系。接合而成的形体，其表面是由形状独特、互不连续的面构成的，但是它们的整体外形是清晰且易于辨认的。同样，接合而成的一群形体，为了在视觉上表现出它们的个性，强化了各组成部分之间的接合处。

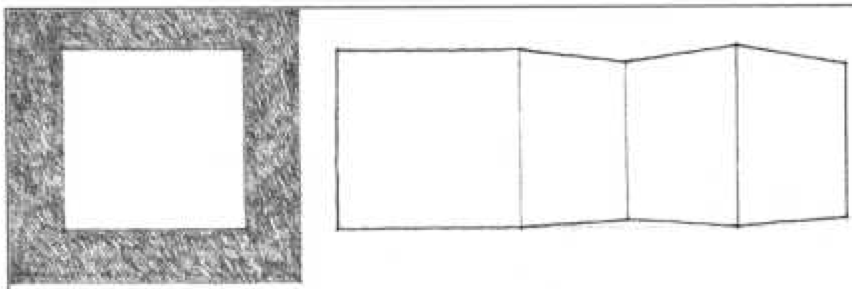
A form can be articulated by:

- differentiating adjoining planes with a change in material, color, texture, or pattern
- developing corners as distinct linear elements independent of the abutting planes
- removing corners to physically separate neighboring planes
- lighting the form to create sharp contrasts in tonal value along edges and corners

一个形体可以用下列方式进行接合：
- 以材料、色彩、质感或图案的变化来区分相连的面
- 将转角处理成独特的线式要素，独立于相邻的面
- 移去转角处，使相邻的面切实分开
- 照亮形体，使形体边缘和转角处的色调值形成强烈的对比

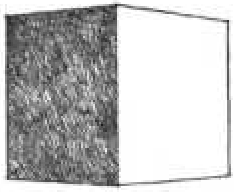
In opposition to the above, the corners of a form can be rounded and smoothed over to emphasize the continuity of its surfaces. Or a material, color, texture, or pattern can be carried across a corner onto the adjoining surfaces to de-emphasize the individuality of the surface planes and emphasize instead the volume of a form.

与上述情况相反，一个形体的转角可以是圆滑的以强调其表面的连续性。或者，将某种材料、色彩、质感或图案越过转角覆盖相邻的表面，以弱化各表面的特性，强调形体的体量。



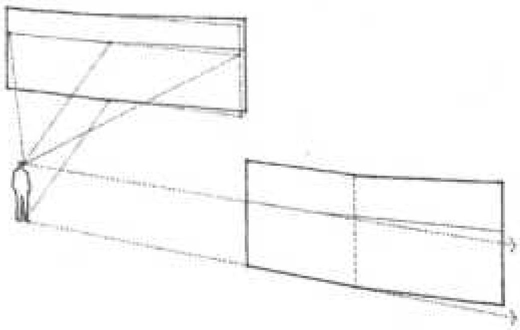
Since the articulation of a form depends to a great degree on how its surfaces meet each other at corners, how these edge conditions are resolved is critical to the definition and clarity of a form.

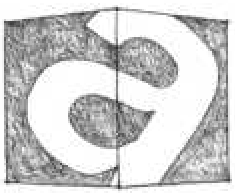
由于形式的接合在很大程度上取决于其表面在转角处是如何交会的，所以如何转化这些边界的条件是限定和明确一个形体的关键。



While a corner can be articulated by simply contrasting the surface qualities of the adjoining planes, or obscured by layering their joining with an optical pattern, our perception of its existence is also affected by the laws of perspective and the quality of light that illuminates the form.

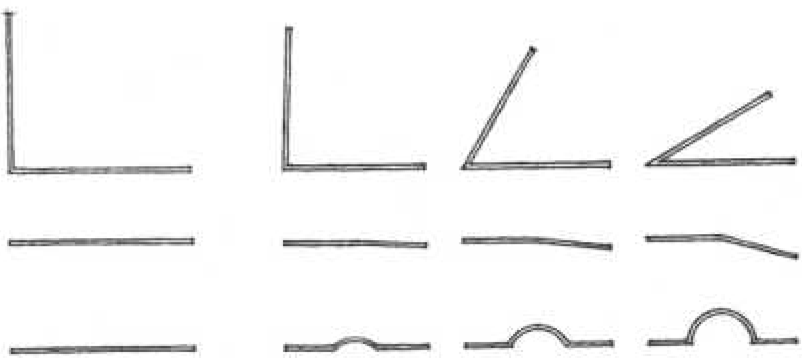
要清楚地表现一个角，可以简单地采用相邻平面的表面特性互相对比的方法；而要模糊地表达一个角，则可以把形成角的各部分叠上一层同样的光学图案。我们对于转角的实际感受还受到透视规律和照射到形体上的光线特性的影响。





For a corner to be formally active, there must be more than a slight deviation in the angle between the adjoining planes. Since we constantly search for regularity and continuity within our field of vision, we tend to regularize or smooth out slight irregularities in the forms we see. For example, a wall plane that is bent only slightly will appear to be a single flat plane, perhaps with a surface imperfection. A corner would not be perceived.

一个转角如果要在形式上活跃起来，相邻平面之间的角度偏差不能太小。因为我们通常在自己的视野中寻找规律性和连续性，因此我们倾向于将看到的形体进行规整化处理或忽略那些微小的不规则因素。比如，一面稍稍弯折的墙，看上去和一面平整的墙一样，也许只是表面不尽完美而已。转角将难以察觉。



At what point do these formal deviations become an acute angle? . . . a right angle?

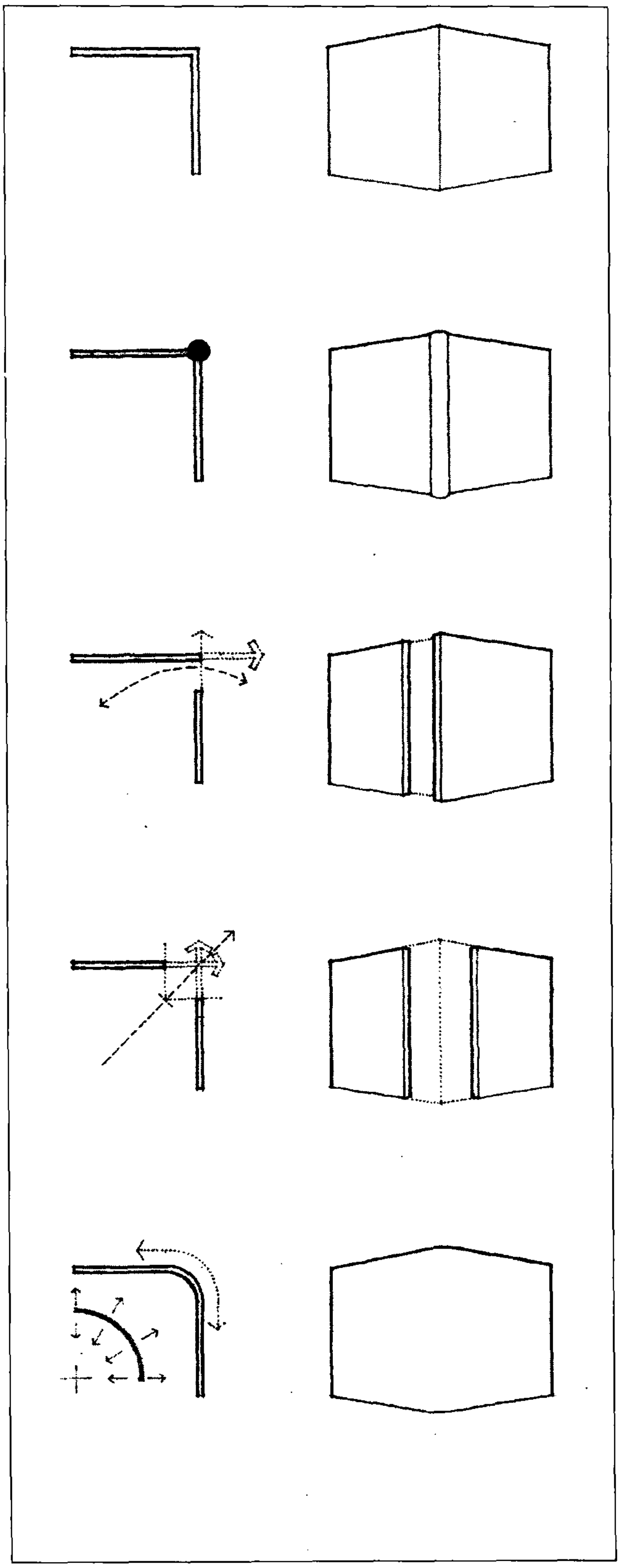
从哪一点开始这些形式上的偏差变成一个锐角？……一个直角？

a segmented line? . . . a straight line?

一条折线？……一条直线？

a circular segment? . . . a change in a line's contour?

一个圆形的片段？……一条直线的轮廓变化？



Corners define the meeting of two planes. If the two planes simply touch and the corner remains unadorned, the presence of the corner will depend on the visual treatment of the adjoining surfaces. This corner condition emphasizes the volume of a form.

转角限定了两个面的相交。如果两个面直接接触，而且转角处不加修饰，那么转角部位所呈现的形式取决于邻接表面所作的视觉处理。这种转角状态强调的是形体的体量。

A corner condition can be visually reinforced by introducing a separate and distinct element that is independent of the surfaces it joins. This element articulates the corner as a linear condition, defines the edges of the adjoining planes, and becomes a positive feature of the form.

引入一个独立的、特征明显而又不同于所连接的面的要素，可以使转角处在视觉上得到加强。这个要素把转角处清晰地表达为线状，勾勒出邻接表面的边际，并且成为形体的明确特点。

If an opening is introduced to one side of the corner, one of the planes will appear to bypass the other. The opening diminishes the corner condition, weakens the definition of the volume within the form, and emphasizes the planar qualities of the neighboring surfaces.

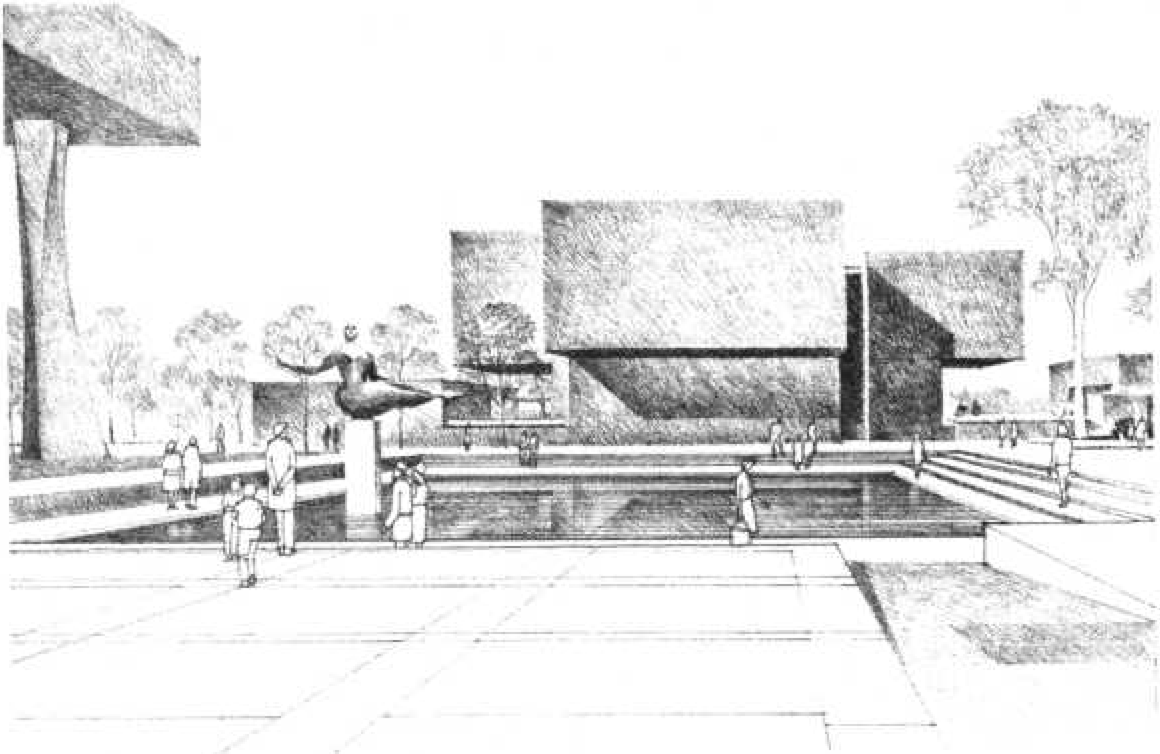
如果转角的一边引入一个空当，一个面就会像要越过另外一个面似的。这个空当缓和了转角的感觉，削弱了形体对于体量的限定，并且强化了相邻表面所具有的面的特征。

If neither plane is extended to define the corner, a volume of space is created to replace the corner. This corner condition deteriorates the volume of the form, allows the interior space to leak outward, and clearly reveals the surfaces as planes in space.

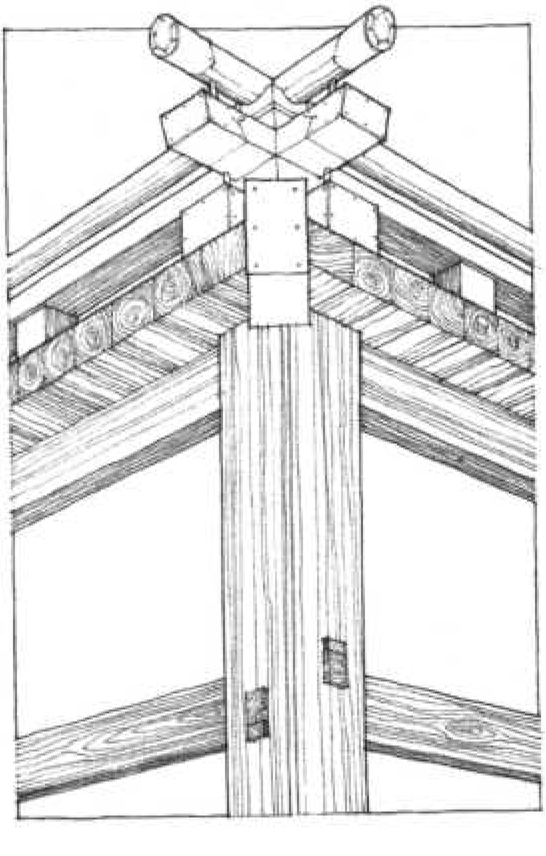
如果两个面都没有延伸出去限定一个转角，那么就会产生一个由空间组成的体量来替代转角。这种转角形态瓦解了形体的体量，使内部空间泄露出来，并且把两个表面清楚地表达为空间中的两个面。

Rounding off the corner emphasizes the continuity of the bounding surfaces of a form, the compactness of its volume, and softness of its contour. The scale of the radius of curvature is important. If too small, it becomes visually insignificant; if large, it affects the interior space it encloses and the exterior form it describes.

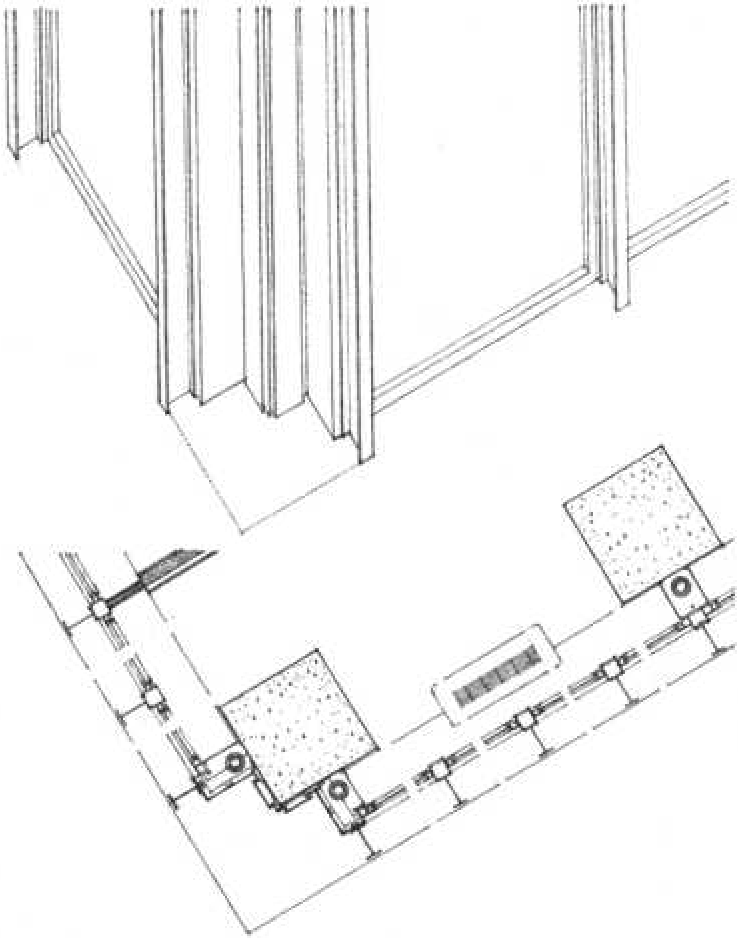
将转角做成圆形，强调了形体表面的连续性、体量的密实性和外轮廓的柔和性。圆角半径的尺度是很重要的。如果太小，会没有视觉效果；如果太大，则会影响到它所围起的内部空间和它所形成的外部形式。



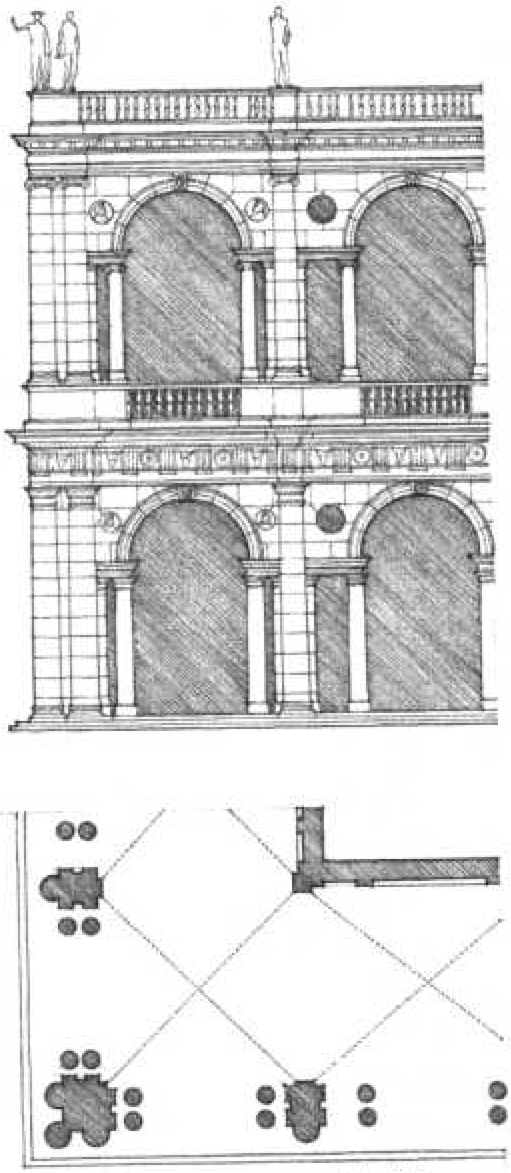
Everson Museum, Syracuse, New York, 1968, I.M. Pei.
The unadorned corners of the forms emphasize the volume of their mass.
埃弗森博物馆，锡拉丘兹，纽约州，1968年，贝聿铭
形体中没有修饰的转角，强调了建筑体量的容积。



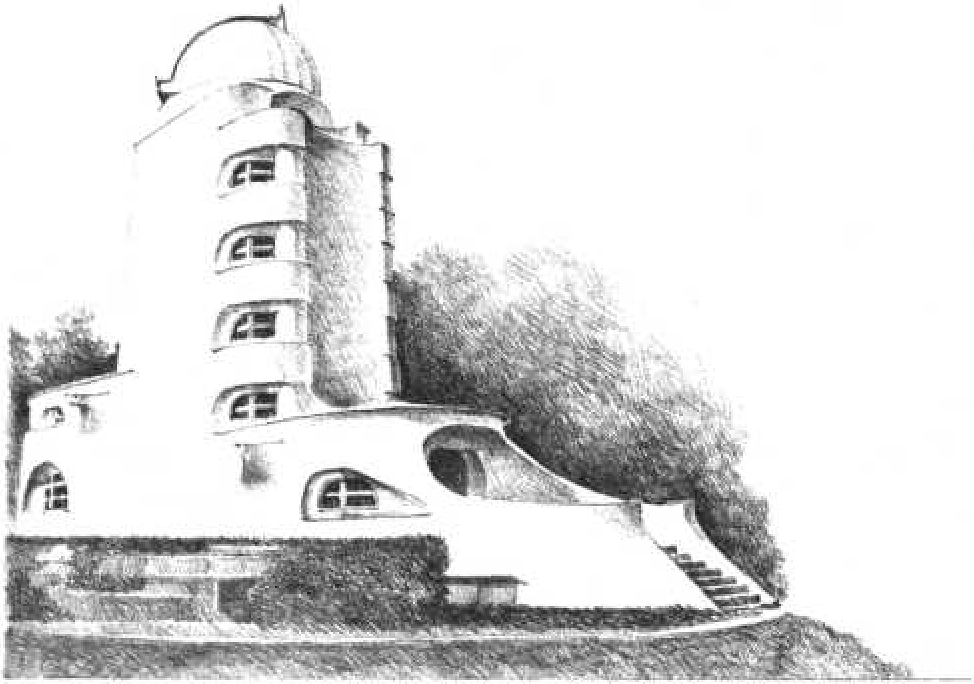
Corner Detail, Izumo Shrine, Shimane Prefecture, Japan, A.D. 717 (last rebuilt in 1744).
The timber joinery articulates the individuality of the members meeting at the corner.
转角细部，出云大社，岛根县，日本，717年（最后一次复建是在1744年）
精美的木制节点清楚地表明了在转角处相接的各要素的特点。



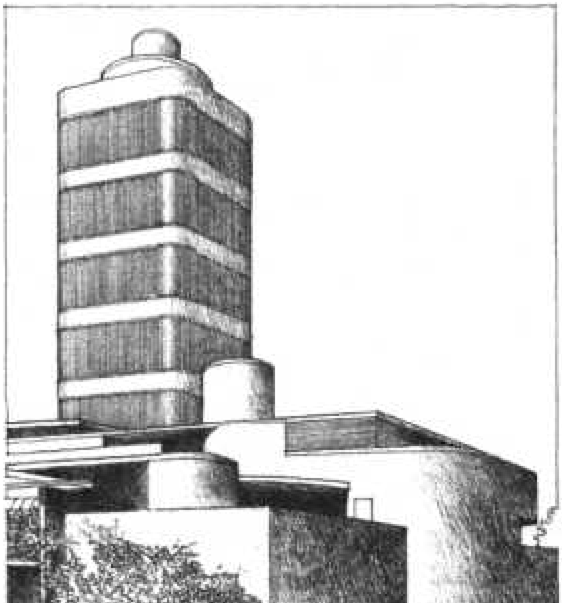
Corner Detail, Commonwealth Promenade Apartments, Chicago, 1953–1956, Mies van der Rohe.
The corner member is recessed to be independent of the adjoining wall planes.
转角细部，国民步廊公寓，芝加哥，1953年—1956年，密斯·凡德罗
为了独立于邻接的墙平面，转角元素向内凹进。



Corner Detail, The Basilica, Vicenza, Italy, 1545, Andrea Palladio.
The corner column emphasizes the edge of the building form.
转角细部，巴西利卡，维琴察，意大利，1545年，A.帕拉第奥
角部的柱子强调了建筑形体的边缘。



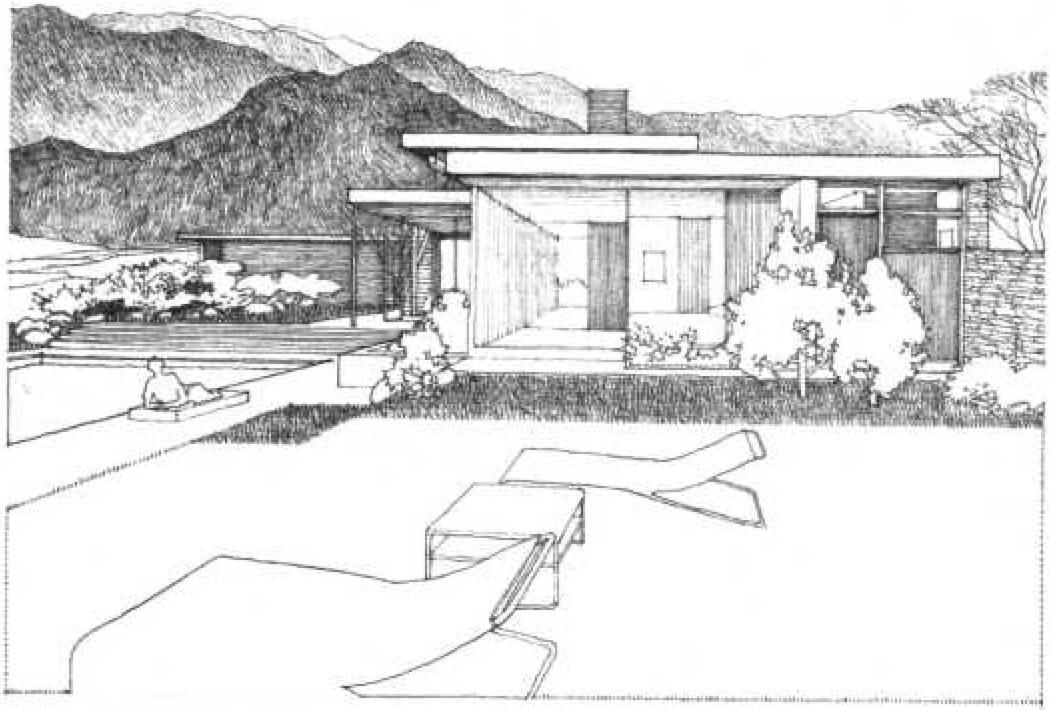
Einstein Tower, Potsdam, Germany, 1919, Eric Mendelsohn
爱因斯坦塔楼，波茨坦，德国，1919年，E. 门德尔松



Rounded corners express continuity of surface, compactness of volume, and softness of form.

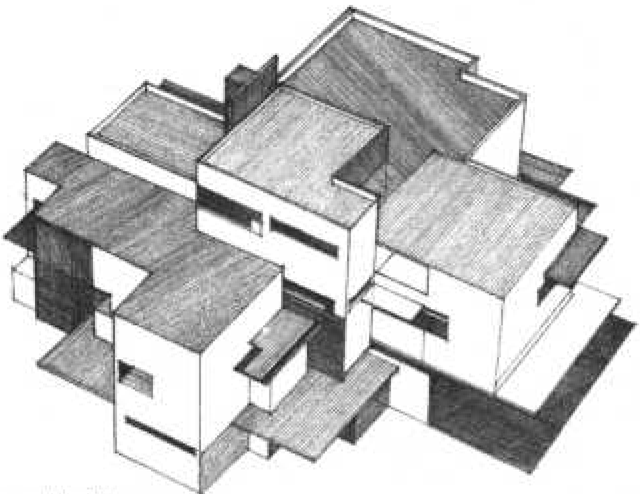
圆角表现出表面的连续性、体量的密实性和形体的柔和性。

Laboratory Tower, Johnson Wax Building, Racine, Wisconsin, 1950, Frank Lloyd Wright
实验室塔楼，约翰逊制蜡公司大楼，雷辛，威斯康星州，1950年，F. L. 莱特

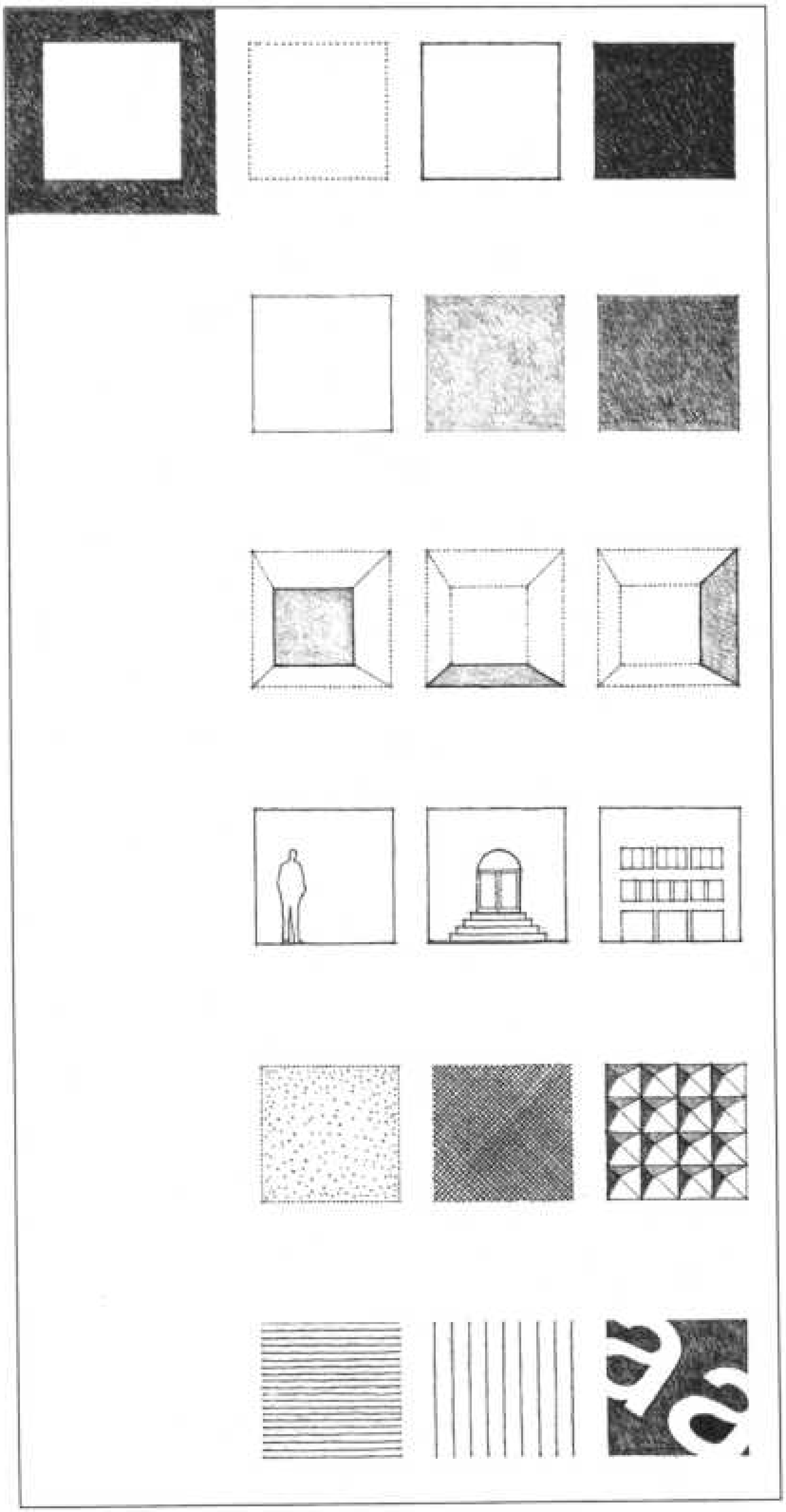


Kaufmann Desert House, Palm Springs, California, 1946, Richard Neutra
考夫曼沙漠别墅，帕姆斯普林，加利福尼亚州，1946年，R.纽特拉

Openings at corners emphasize the definition of planes over volume.
在转角处开洞，使面的表达比体量的表达更为突出。



Architectural Design Study, 1923, Van Doesburg and Van Esteren
建筑设计研究，1923年，凡杜伊斯堡和凡埃斯特伦



Our perception of the shape, size, scale, proportion, and visual weight of a plane is influenced by its surface properties as well as its visual context.

我们对于一个平面的形状、尺寸、尺度、比例和视觉重量的感知，受到其表面的特性及其视觉环境的影响。

- A distinct contrast between the surface color of a plane and that of the surrounding field can clarify its shape, while modifying its tonal value can either increase or decrease its visual weight.

  一个平面的形状，可以用它的表面和周围地带的色彩对比而明确表达出来，同时调整其色调值可以增加或减低其视觉重量。

- A frontal view reveals the true shape of a plane; oblique views distort it.

  正面视图反映了一个面的真实形状；斜向视图则会歪曲形状的真实性。

- Elements of known size within the visual context of a plane can aid our perception of its size and scale.

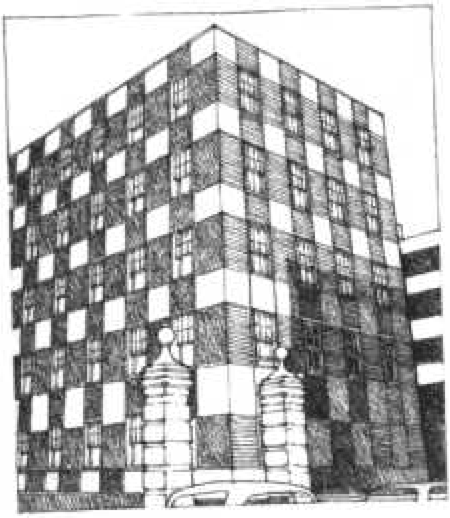
  一个面的视觉环境中有尺寸已知的要素，可以帮助我们感知面的尺寸和尺度。

- Texture and color together affect the visual weight and scale of a plane and the degree to which it absorbs or reflects light and sound.

  表面的质感和色彩会一起影响到一个面的视觉重量和尺度，以及这个面吸收或反射光和声音的程度。

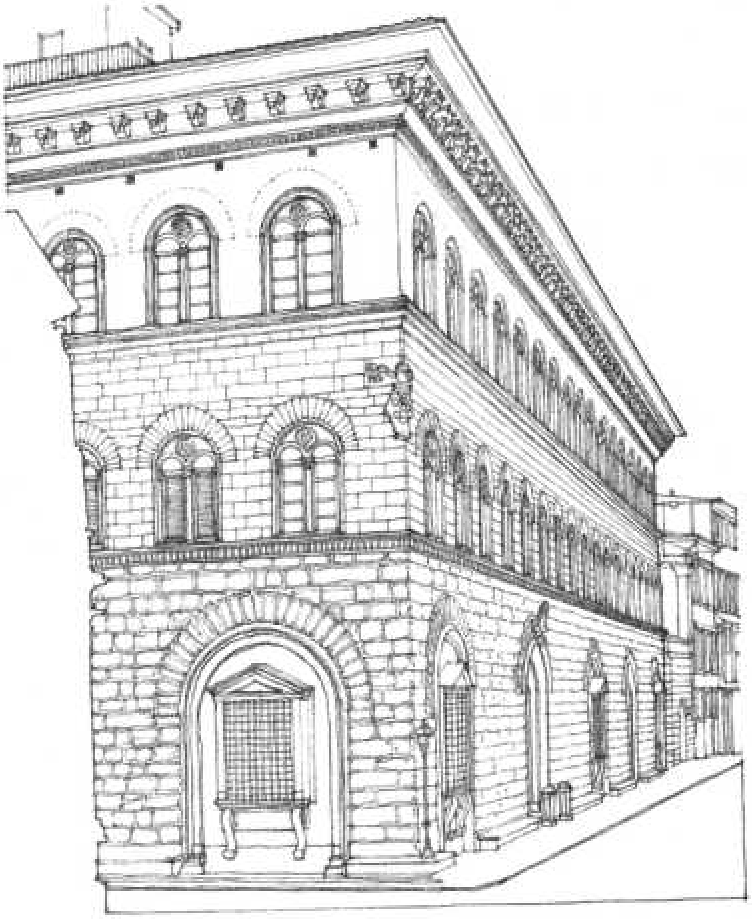
- Directional or oversized optical patterns can distort the shape or exaggerate the proportions of a plane.

  有方向或尺度过大的光学图案，会歪曲平面的形状或夸大平面的比例。



Vincent Street Flats, London, 1928, Sir Edwin Lutyens

文森特大街公寓，伦敦，1928年，E. 勒琴斯爵士

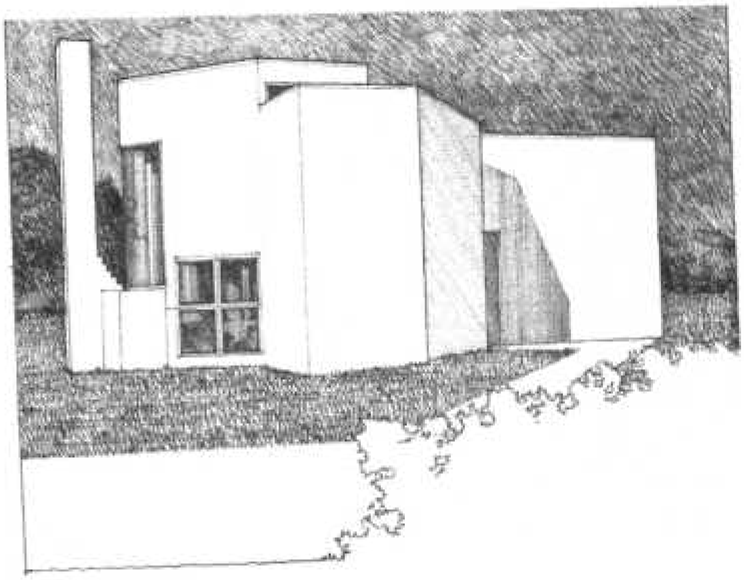


Palazzo Medici-Ricardo, Florence, Italy, 1444–1460, Michelozzi

梅迪奇-里卡德宫，佛罗伦萨，意大利，1444年—1460年，米凯洛奇

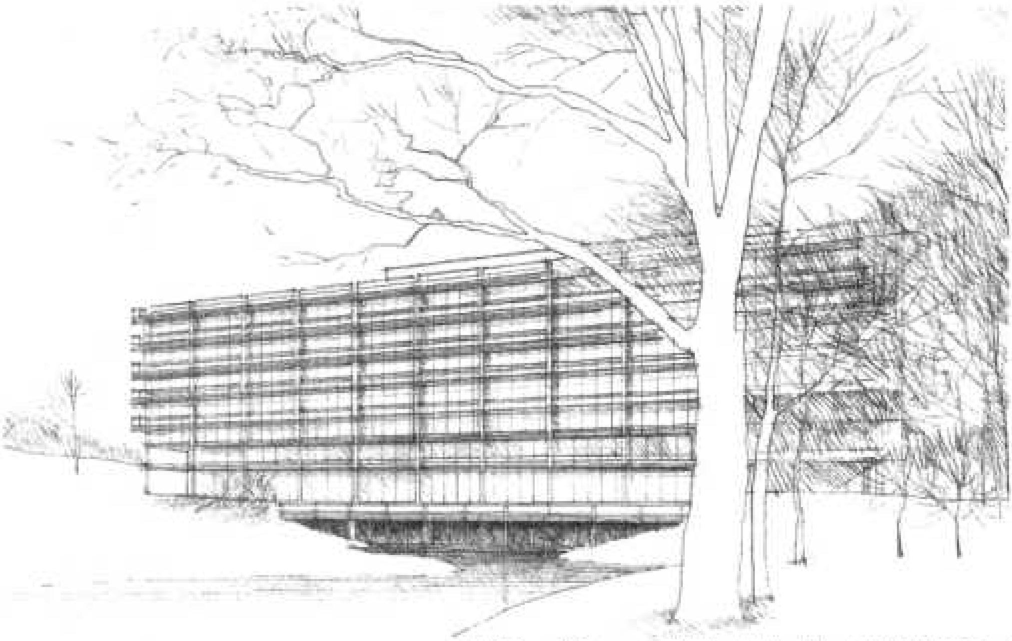
The color, texture, and pattern of surfaces articulate the existence of planes and influence the visual weight of a form.

表面的色彩、质感和图案清晰地反映着面的存在，并影响到一个形体的视觉重量。



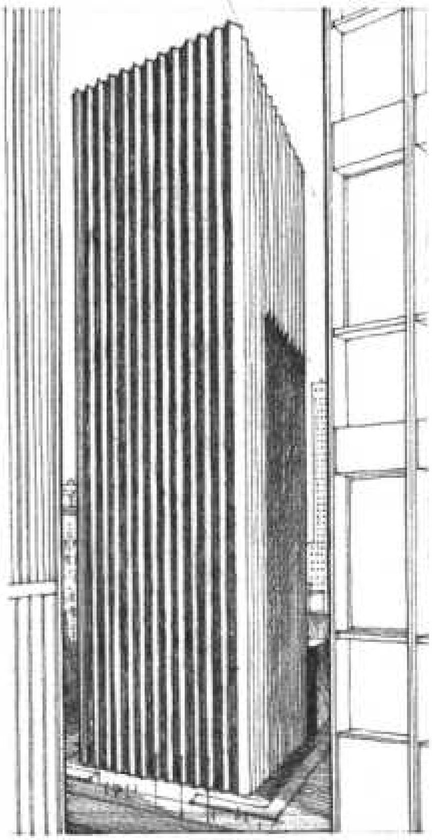
Hoffman House, East Hampton, New York, 1966–1967, Richard Meier

霍夫曼住宅，东汉普顿，纽约州，1966年—1967年，R. 迈耶



John Deere & Company Building, Moline, Illinois, 1961–1964, Eero Saarinen & Associates.
The linear sun-shading devices accentuate the horizontality of the building form.

约翰·迪尔和公司大楼，莫林，伊利诺斯州，1961年—1964年，E.沙里宁事务所
线式的遮阳设施强调了建筑形体的横向特征。

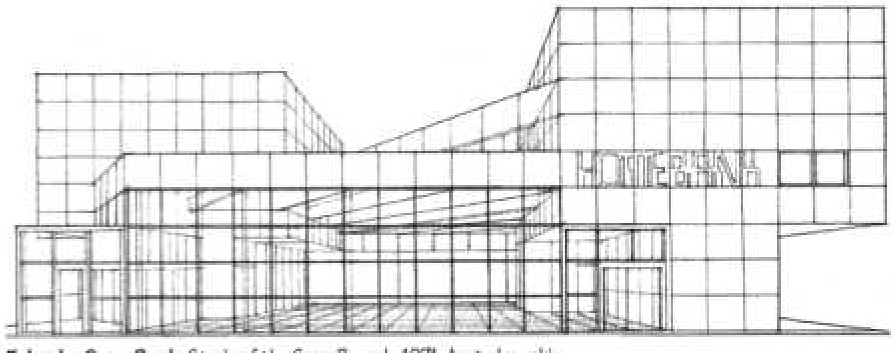


CBS Building, New York City, 1962–1964, Eero Saarinen & Associates.
Linear columnar elements emphasize the verticality of this high-rise structure.

CBS 大厦，纽约市，1962年—1964年，E.沙里宁事务所
线式的柱要素强调了这座高层建筑结构的竖向特征。

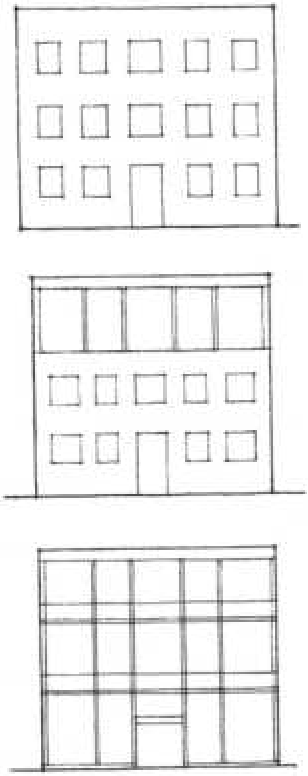
Linear patterns have the ability to emphasize the height or length of a form, unify its surfaces, and define its textural quality.

线式图案能强调形体的高度或长度，统一其表面，并限定其质感特征。



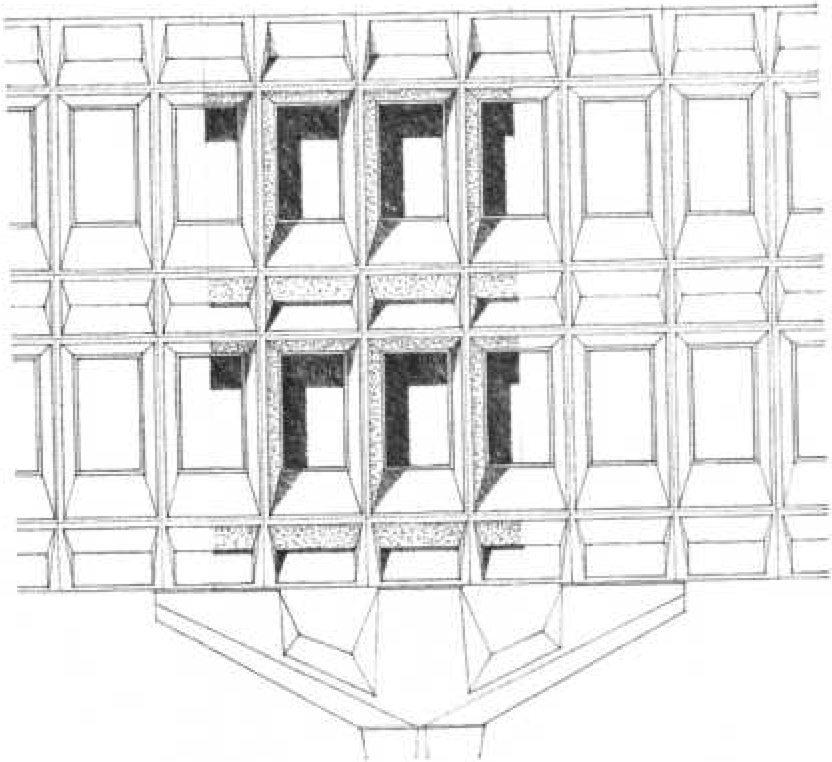
Fukuoka Sogo Bank, Study of the Saga Branch, 1971, Arata Isozaki.
A grid pattern unifies the surfaces of the three-dimensional composition.

福冈银行，佐贺分行方案研究，1971年，矶崎新
网格状的图案使三度图形的各个表面统一在一起。



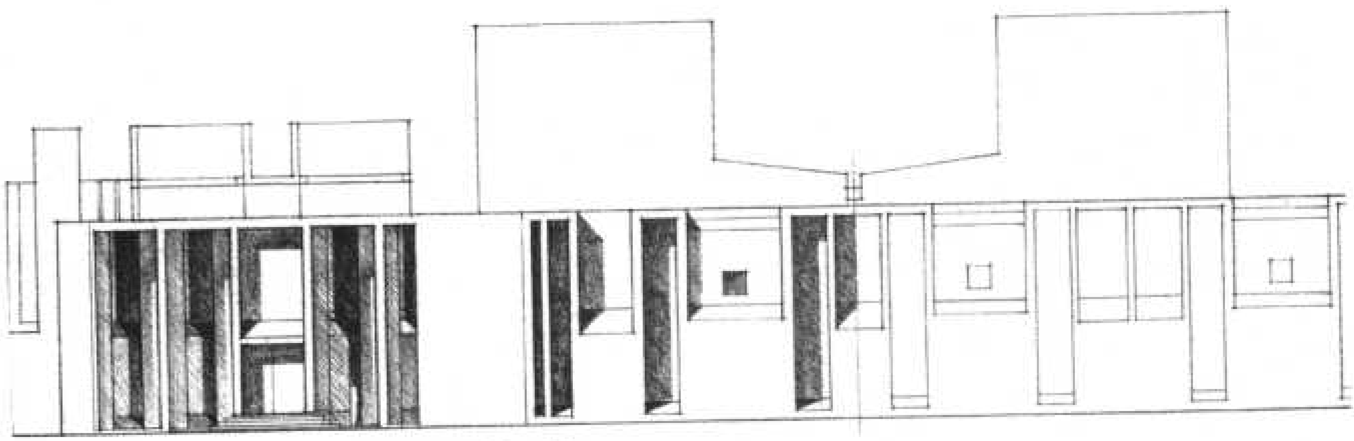
A transformation from a pattern of openings in a plane to an open facade articulated by a linear framework.

从面上有开洞的图案转化为线式框架连接的开放立面。



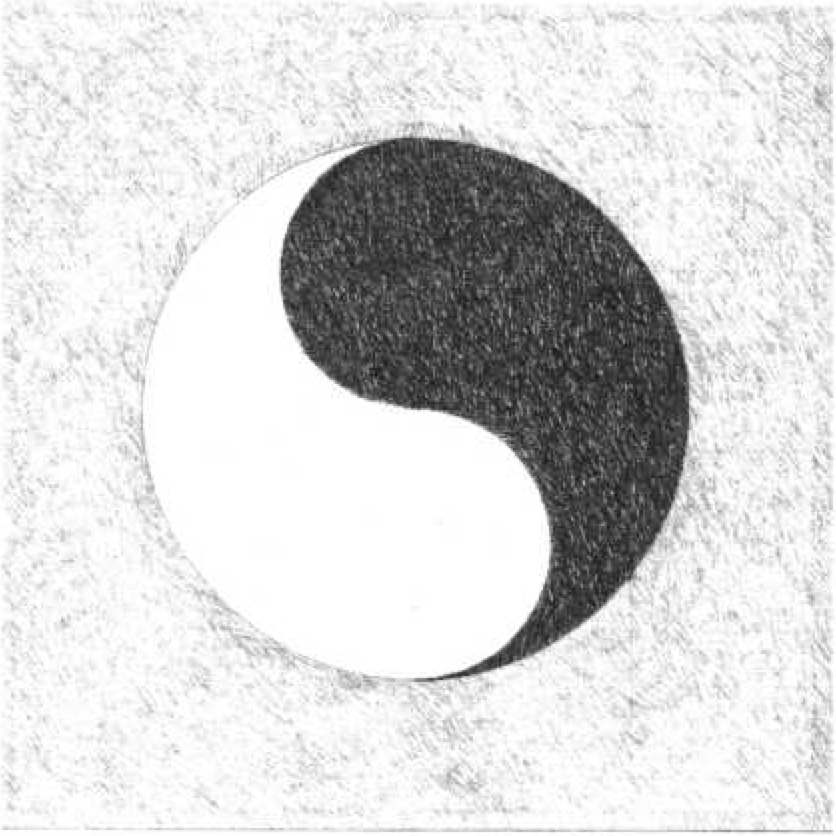
IBM Research Center, La Guade, Var, France, 1960–1961, Marcel Breuer.
The three-dimensional form of the openings creates a texture of light, shade, and shadows.

IBM研究中心，拉盖德，瓦尔，法国，1960年—1961年，M. 布鲁尔
洞口的三度形式产生出光与阴影的质感。



First Unitarian Church, Rochester, New York, 1956–1967, Louis Kahn.
The pattern of openings and cavities interrupt the continuity of the exterior wall planes.

第一唯一神教教堂，罗彻斯特，纽约州，1956年—1967年，L. 康
孔与洞的形式打断了外墙面的连续性。



3 形式与空间
Form & Space

"We put thirty spokes together and call it a wheel;
But it is on the space where there is nothing
that the utility of the wheel depends.
We turn clay to make a vessel;
But it is on the space where there is nothing
that the utility of the vessel depends.
We pierce doors and windows to make a house;
and it is on these spaces where there is nothing
that the utility of the house depends.
Therefore, just as we take advantage of what is,
we should recognize the utility of what is not."

Lao-tzu
Tao Te Ching
6th century B.C.

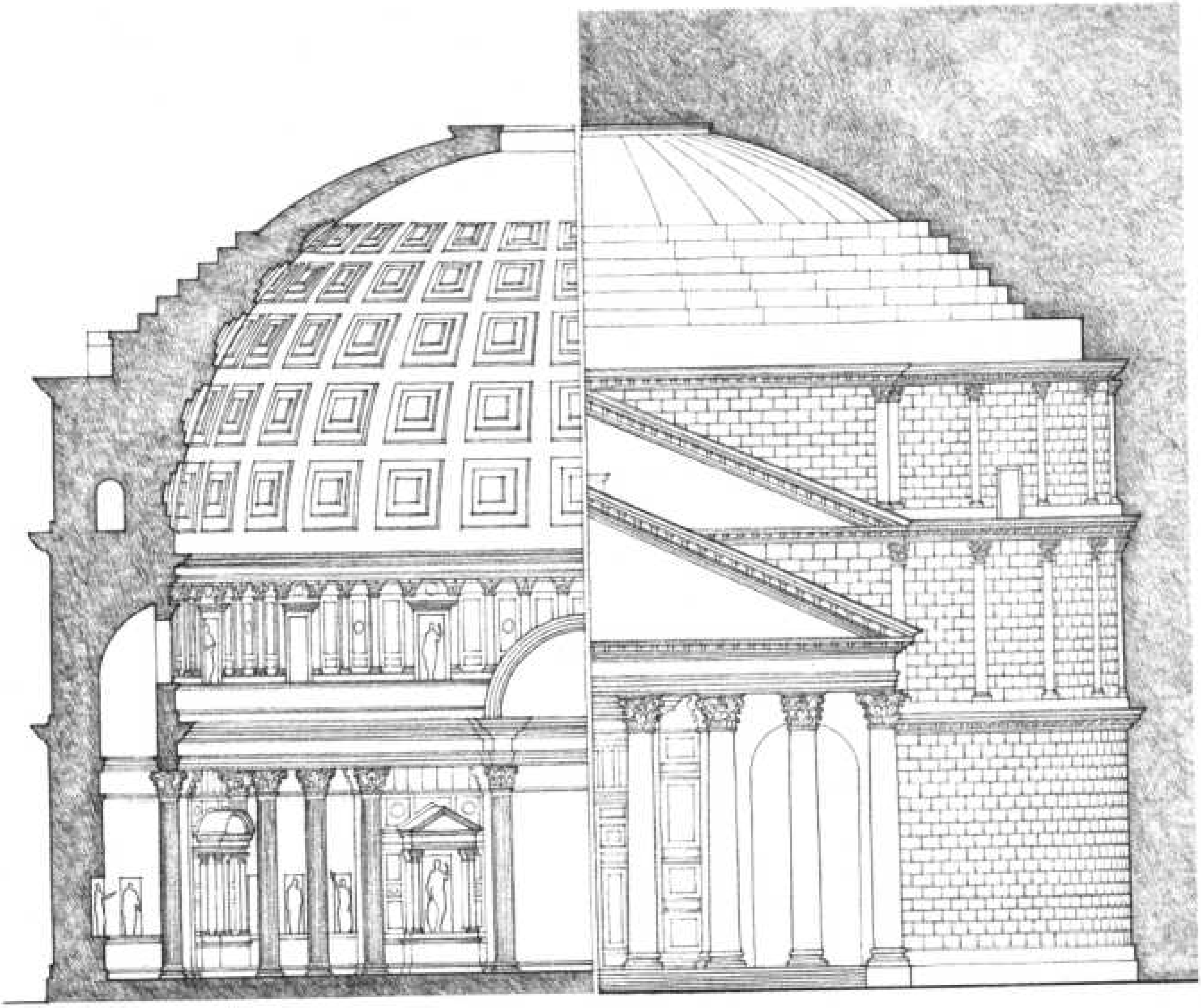
"三十辐，共一毂，当其无，有车之用。埏埴以为器，当其无，有器之用。凿户牖以为室，当其无，有室之用。故有之以为利，无之以为用。"

老子
《道德经》
公元前6世纪

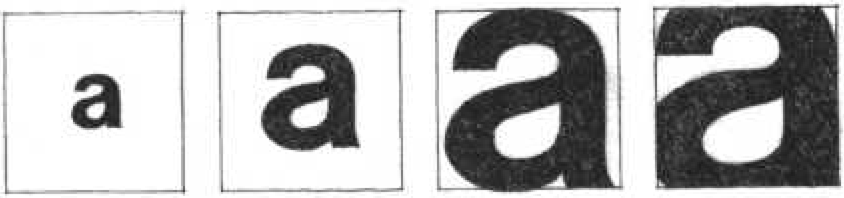
Space constantly encompasses our being. Through the volume of space, we move, see forms, hear sounds, feel breezes, smell the fragrances of a flower garden in bloom. It is a material substance like wood or stone. Yet it is an inherently formless vapor. Its visual form, its dimensions and scale, the quality of its light—all of these qualities depend on our perception of the spatial boundaries defined by elements of form. As space begins to be captured, enclosed, molded, and organized by the elements of mass, architecture comes into being.

空间连续不断地包围着我们。通过空间的容积我们进行活动、观察形体、听到声音、感受清风、闻到百花盛开的芳香。空间像木材和石头一样，是一种实实在在的物质。然而，空间天生是一种不定形的东西。它的视觉形式、它的量度和尺度，它的光线特征——所有这些特点都依赖于我们的感知，即我们对于形体要素所限定的空间界限的感知。当空间开始被体量要素所捕获、围合、塑造和组织的时候，建筑就产生了。





The Pantheon, Rome, A.D. 120–124
万神庙，罗马，120年—124年



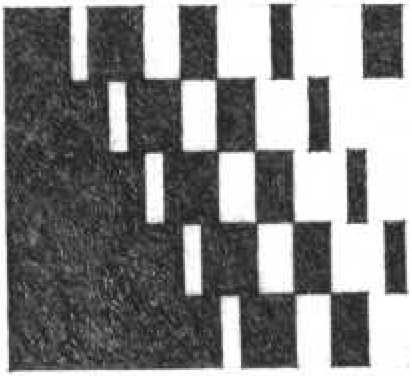


Our visual field normally consists of heterogeneous elements that differ in shape, size, color, or orientation. To better comprehend the structure of a visual field, we tend to organize its elements into two opposing groups: positive elements which are perceived as figures and negative elements which provide a background for the figures.

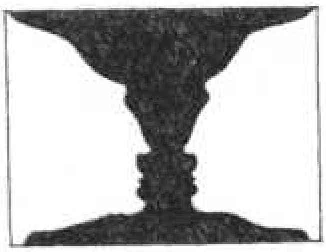
我们的视野中，通常包含不同种类的要素，这些要素的形状、尺寸、颜色或方向都不相同。为了更好地理解一个视野的结构，我们往往把其中的要素归为相反的两组：被理解为图的正要素和给图提供背景的负要素。

Our perception and understanding of a composition depends on how we interpret the visual interaction between the positive and negative elements within its field. On this page, for example, letters are seen as dark figures against the white background of the paper surface. Consequently, we are able to perceive their organization into words, sentences, and paragraphs. In the diagrams to the left, the letter 'a' is seen as a figure not only because we recognize it as a letter in our alphabet but also because its profile is distinct, its value contrasts with that of its background, and its placement isolates it from its context. As it grows in size relative to its field, however, other elements within and around it begin to compete for our attention as figures. At times, the relationship between figures and their background is so ambiguous that we visually switch their identities back and forth almost simultaneously.

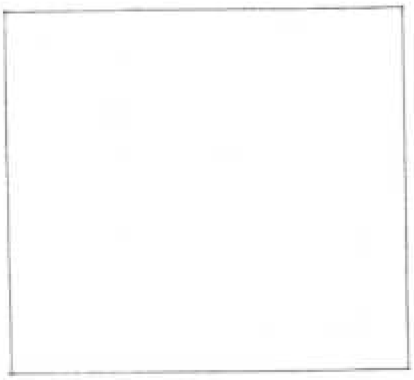
我们对于一个构图的感知和理解，取决于我们如何解释图形中正要素与负要素之间的视觉作用。比如，在本页中，字母对于纸面的白底而言可以看作是黑色的图，因而我们可以感知这些字母所组成的单词、句子和段落。在左侧的图里，字母“a”被看作为图，这不仅仅因为我们知道它是字母表中的一个字母，而且还因为它的外形独特，它的明度与背景形成对比，并且它所在的位置使其与背景隔离开来。但是，随着它的尺寸相对于它所处的范围而增大的时候，字母当中或字母周围的其他要素就开始作为图来争夺我们的注意力。有时，图与底之间的关系变得非常含糊，以至于我们的视觉会同时不停地切换它们的图底属性。

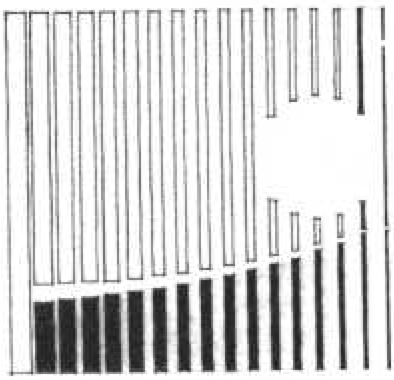


White-on-Black or Black-on-White?
白图黑底还是黑图白底？



Two Faces or a Vase?
是两幅面孔还是一个花瓶？



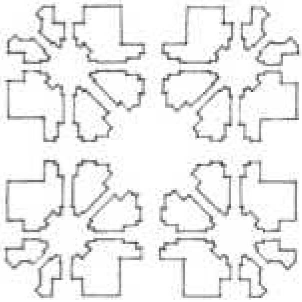


In all cases, however, we should understand that figures, the positive elements that attract our attention, could not exist without a contrasting background. Figures and their background, therefore, are more than opposing elements. Together, they form an inseparable reality—a unity of opposites—just as the elements of form and space together form the reality of architecture.

但是，在所有的情况下我们都必须明白：吸引我们注意力的正要素“图”，如果没有一个与之形成对比的背景，那是不可能存在的。因此，图与底的关系不仅仅是对立的要素。二者共同形成一个不可分离的实体，一个对立的统一体，就像形式与空间要素共同形成了建筑实物一样。

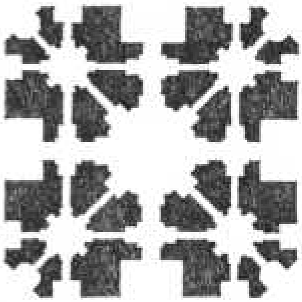
Taj Mahal, Agra, India, 1630–1653. Shah Jahan built this white marble mausoleum for his favorite wife, Muntaz Mahal.

泰姬·玛哈陵，阿格拉，印度，1630年—1653年
S. 加汗为他的爱妻M. 玛哈建造了这座白色大理石的陵墓。



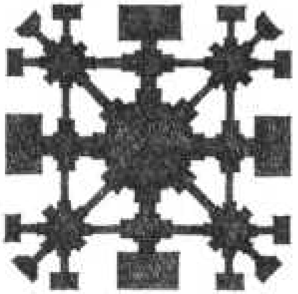
A. Line defining the boundary between solid mass and spatial void

A. 线限定了实体与虚空之间的界限



B. The form of solid mass rendered as a figure

B. 实体的形式被表现为“图”



C. The form of the spatial void rendered as figure

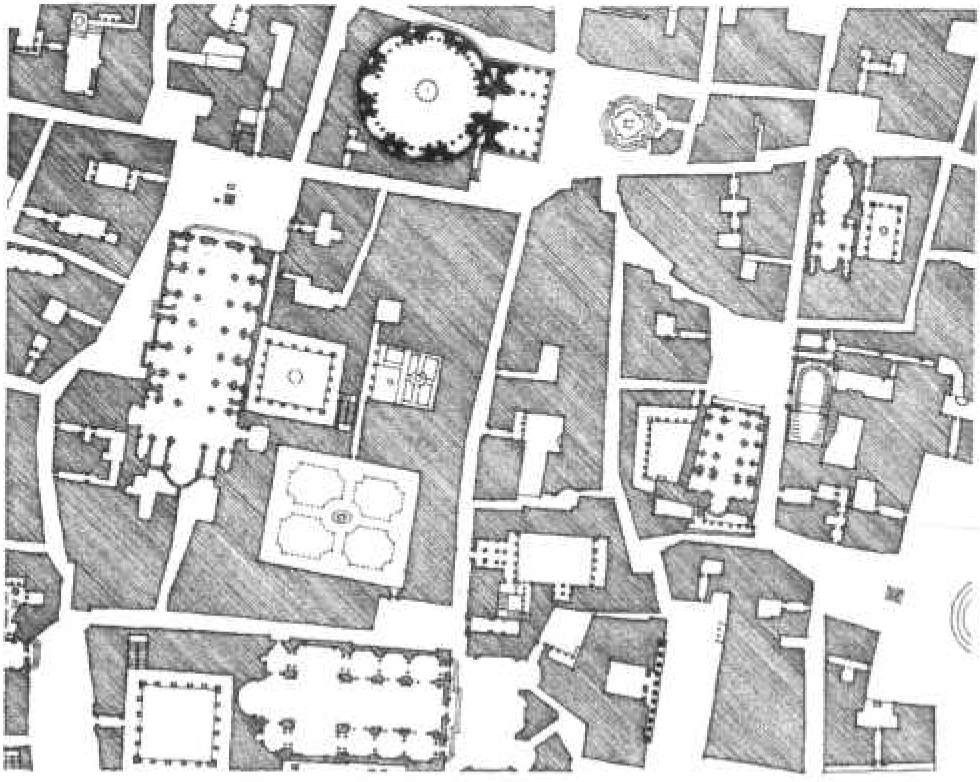
C. 虚空的形式被表现为“图”

Architectural form occurs at the juncture between mass and space. In executing and reading design drawings, we should be concerned with both the form of the mass containing a volume of space as well as the form of the spatial volume itself.

建筑形体出现在实体与空间的接合上。在实施和阅读设计图纸时，我们既要关注包含空间容积的实体形式，也要关注空间容积本身的形式。

Fragment of a Map of Rome, drawn by Giambattista Nolli in 1748

罗马地图片段，G.诺里于1748年绘制



Depending on what we perceive to be positive elements, the figure-ground relationship of the forms of mass and space can be inverted in different parts of this map of Rome. In portions of the map, buildings appear to be positive forms that define street spaces. In other parts of the drawing, urban squares, courtyards, and major spaces within important public buildings read as positive elements seen against the background of the surrounding building mass.

在这个罗马地图的不同部位上，实体形式与空间形式之间的图底关系可以颠倒，这取决于我们把何者视为正要素。在这张地图的有些部分，建筑物似乎是正要素，限定了街道空间。在该地图的另外一些部分，城市广场，庭院以及重要公共建筑中的主要空间则被当作正要素，与作为背景的周围环境中的建筑实体形成对比。

The symbiotic relationship of the forms of mass and space in architecture can be examined and found to exist at several different scales. At each level, we should be concerned not only with the form of a building but also its impact on the space around it. At an urban scale, we should carefully consider whether the role of a building is to continue the existing fabric of a place, form a backdrop for other buildings, or define an urban space, or whether it might be appropriate for it to stand free as a significant object in space.

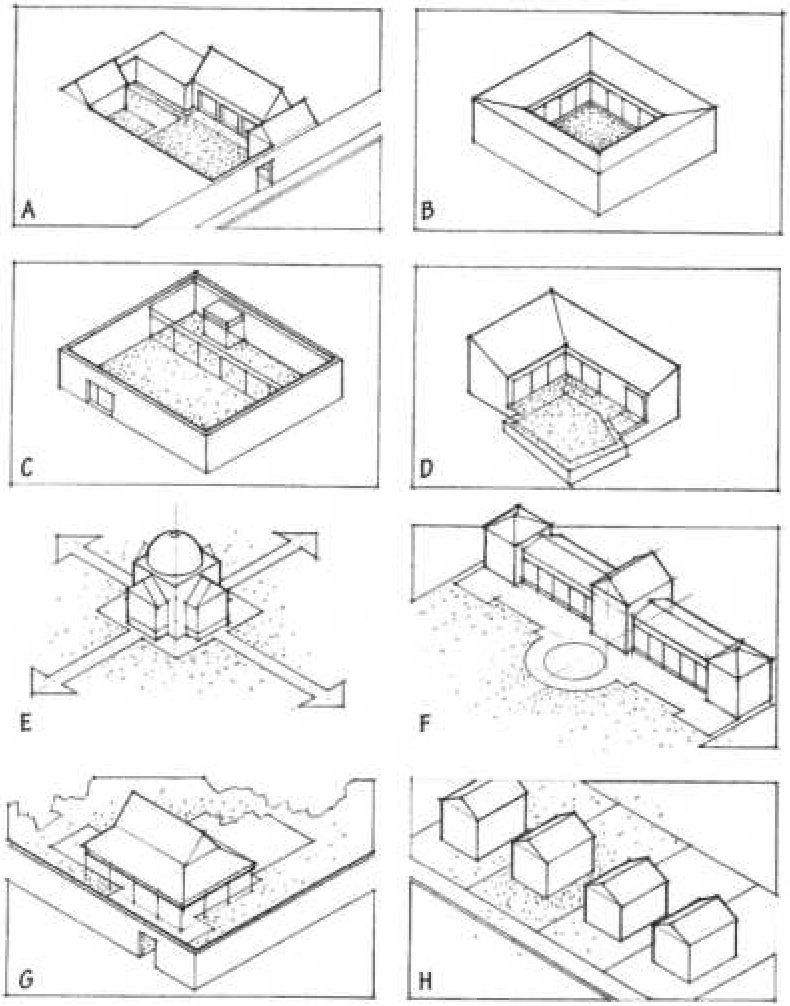
在建筑中，对于实体形式与空间形式之间的共生关系，我们可以通过分析而发现其存在着几种不同程度的变化。无论在哪种程度上，我们不仅要考虑建筑的形式，而且还要考虑它对周围空间的影响。在一个城市的范围内，我们应该精心地考虑一座建筑物的责任，是延续一个场所的现有结构，给其他建筑物当背景，限定一个城市空间；还是作为城市空间中的一个重要物体而适合于独立存在。

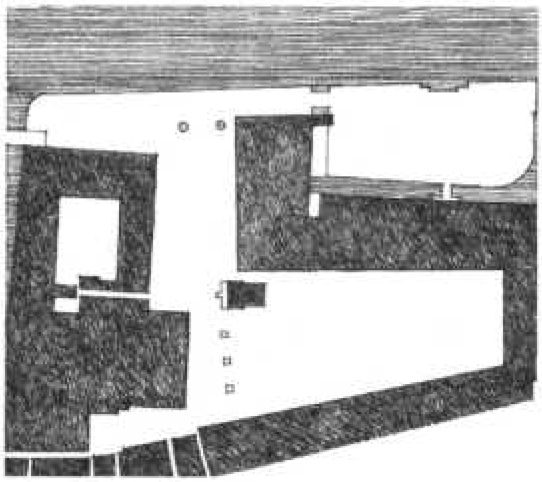
At the scale of a building site, there are various strategies for relating the form of a building to the space around it. A building can:

A. form a wall along an edge of its site and define a positive outdoor space
B. surround and enclose a courtyard or atrium space within its volume
C. merge its interior space with the private outdoor space of a walled site
D. enclose a portion of its site as an outdoor room
E. stand as a distinct form in space and dominate its site
F. stretch out and present a broad face to a feature of its site
G. stand free within its site but have private exterior spaces be an extension of its interior spaces
H. stand as a positive form in negative space

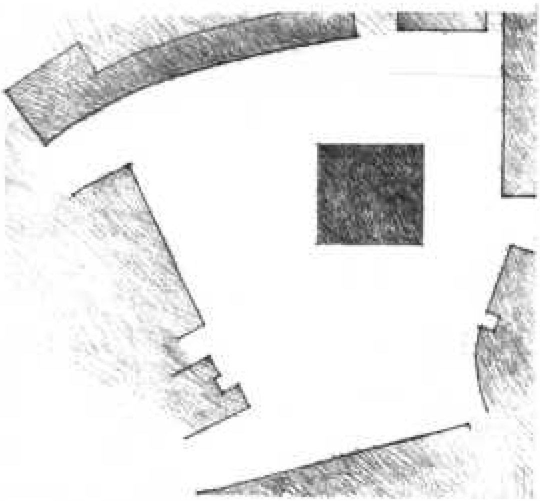
在一座建筑物的基地范围内，处理建筑物与周围空间的关系有各种各样的方法。一座建筑物可以：

A. 沿着基地的边缘形成一面墙并且限定正的室外空间
B. 在建筑物的容积中，环绕或围合一个庭院或中庭空间
C. 把建筑物的内部空间与基地上用围墙围起的私密性室外空间结合在一起
D. 围起基地的一部分作为室外场地
E. 作为一个独特的形体立于空间之中，并控制着建筑物所在的基地
F. 朝着基地富有特色的一面展开并呈现出一幅宽阔的立面
G. 在基地内自由布置，但是有私密性的室外空间作为建筑物室内空间的延伸
H. 在负空间中作为一个正的形体而存在



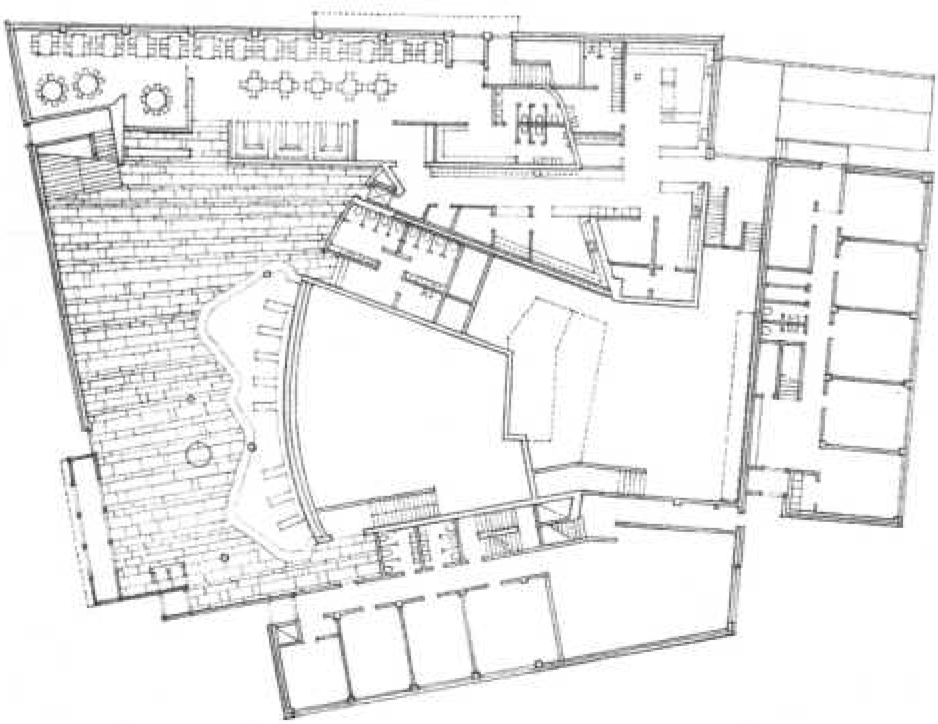


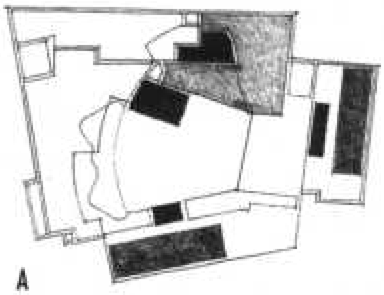
Piazza of San Marco, Venice
圣马可广场，威尼斯

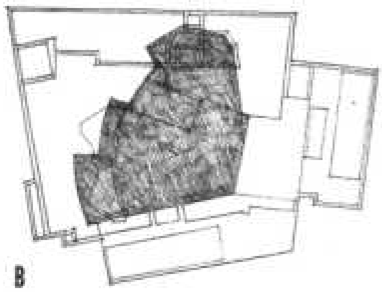


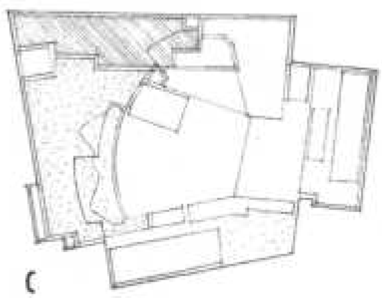
Boston City Hall, 1960, Kallmann, McKinnell & Knowles
波士顿市政厅，1960年，卡尔曼，麦金尼尔和诺尔斯

Theater in Seinäjoki, Finland, 1968–1969, Alvar Aalto
塞纳约基的剧院，芬兰，1968年—1969年，A. 阿尔托




A


B


C

At the scale of a building, we tend to read the configurations of walls as the positive elements of a plan. The white space in between, however, should not be seen simply as background for the walls, but also as figures in the drawing that have shape and form.

在一栋建筑物的范围内，我们倾向于把墙的造型当成平面图中的正要素。但是墙之间的空白空间不应简单地视为墙的背景，而是应当视为有形状和形式的图形。

The form and enclosure of each space in a building either determines, or is determined by, the form of the spaces around it. In the Theater in Seinäjoki by Alvar Aalto, for example, we can distinguish several categories of spatial forms and analyze how they interact. Each category has an active or passive role in defining space.

在建筑中，每个空间的形式和围护物，不是决定了其周围的空间形式就是被周围的空间形式所决定。比如，在A. 阿尔托设计的塞纳约基剧院中，我们可以分辨出好几种类型的空间形式，可以分析这些空间形式是如何相互作用的。每一种类型，在限定空间方面都有主动或被动的作用。

A. Some spaces, such as offices, have specific but similar functions and can be grouped into single, linear, or clustered forms.
B. Some spaces, such as concert halls, have specific functional and technical requirements, and require specific forms that will affect the forms of the spaces around them.
C. Some spaces, such as lobbies, are flexible in nature and can therefore be freely defined by the spaces or grouping of spaces around them.

A. 某些空间，例如办公室，用途虽各异，但有相同的功能，可以把它们组成独立式、线式或组团的形式。
B. 某些空间，例如音乐厅，具有特殊的功能和技术要求，因而需要特殊的形体，由此会影响其周围空间的形式。
C. 某些空间，例如门厅，其性质是灵活的，因此可以被周围的空间或空间组团自由划分。

Even at the scale of a room, articles of furnishings can either stand as forms within a field of space or serve to define the form of a spatial field.

即使在一个房间的范围内，家具物品既可以作为形体立于某一空间领域中，也可以用来限定空间领域的形式。



Square in *Giron*, Colombia, South America
吉隆的广场，哥伦比亚，南美

When we place a two-dimensional figure on a piece of paper, it influences the shape of the white space around it. In a similar manner, any three-dimensional form naturally articulates the volume of space surrounding it and generates a field of influence or territory which it claims as its own. The following section of this chapter looks at horizontal and vertical elements of form and presents examples of how various configurations of these formal elements generate and define specific types of space.

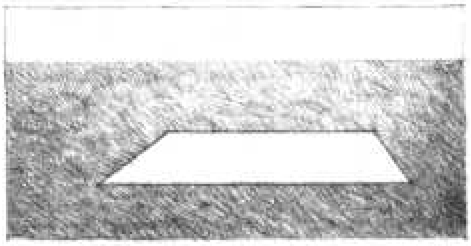
当我们把一幅两度的图形布置在一张纸上的时候，它会影响到周围白色空间的形状。同理，任何三度的形体自然会清晰地表达出其周围的空间容积，并且产生一个受到影响的范围或能够据为己有的领地。本章的其余部分着眼于水平和垂直的形式要素，并举例说明这些形式要素构成的图形是如何产生并限定特定空间类型的。

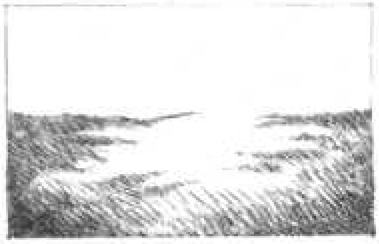
Base Plane

A horizontal plane laying as a figure on a contrasting background defines a simple field of space. This field can be visually reinforced in the following ways.

基面

一个水平面作为一个图形平放在反差很大的背景上，就限定出一个简单的空间领域。用下面几种方法可以使该领域在视觉上得到加强。



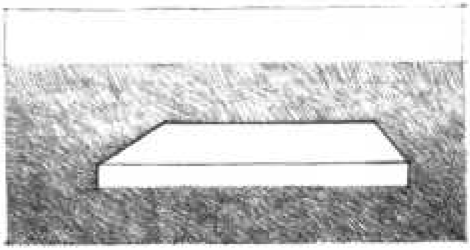


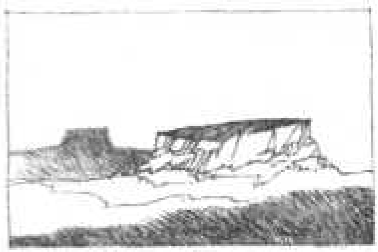
Elevated Base Plane

A horizontal plane elevated above the ground plane establishes vertical surfaces along its edges that reinforce the visual separation between its field and the surrounding ground.

基面抬起

水平面抬到地面以上，则会沿着水平面的边界生成若干个垂直表面，这就在视觉上强化了该领域与周围地面之间的分离感。



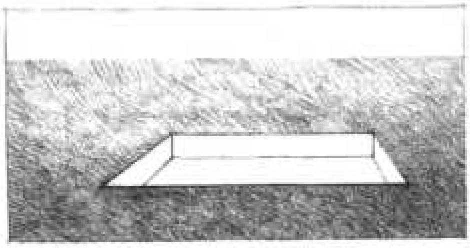


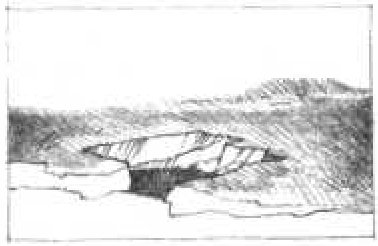
Depressed Base Plane

A horizontal plane depressed into the ground plane utilizes the vertical surfaces of the lowered area to define a volume of space.

基面下沉

一个水平面下沉到地面以下，利用下沉部分的垂直表面来限定一个空间容积。



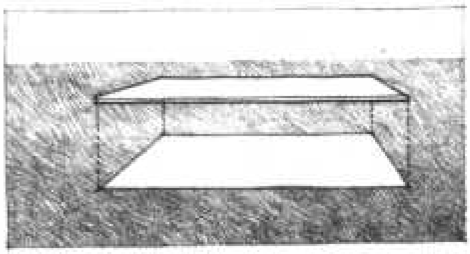


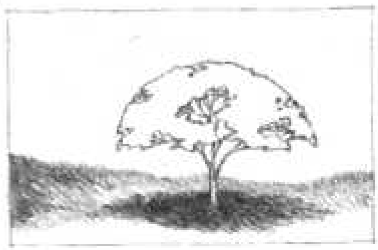
Overhead Plane

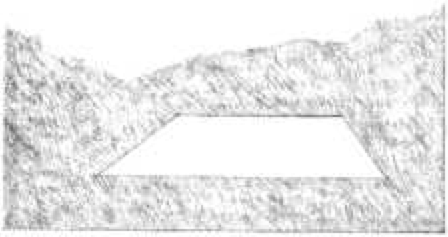
A horizontal plane located overhead defines a volume of space between itself and the ground plane.

顶面

水平面位于头顶之上，则在顶面与地面之间限定出一个空间容积。



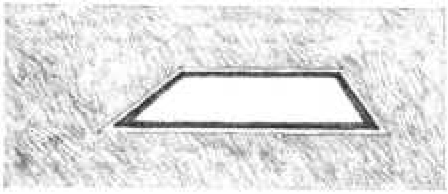






For a horizontal plane to be seen as a figure, there must be a perceptible change in color, tone, or texture between its surface and that of the surrounding area.

为了使一个水平面能被看成一个图形，在其表面和周围区域的表面之间，必须在色彩、明度或质感上具有可以感知的变化。

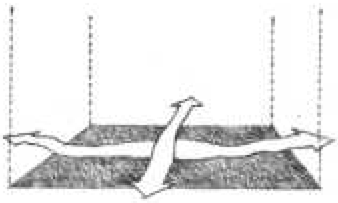




The stronger the edge definition of a horizontal plane is, the more distinct will be its field.

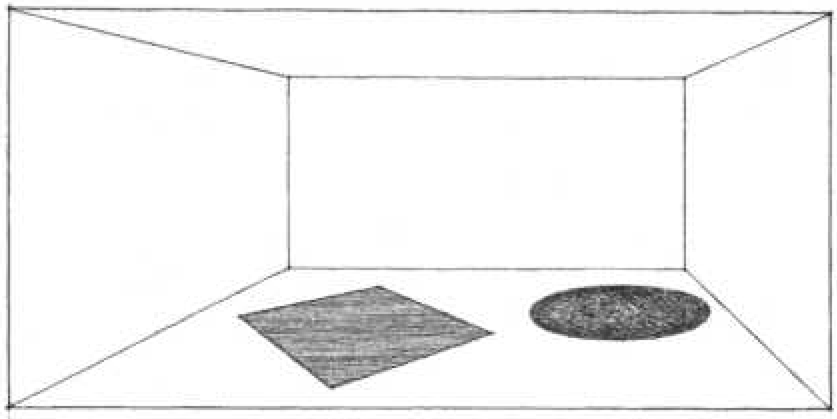
水平面的边界越清晰，其领域则越明确。





Although there is a continuous flow of space across it, the field nevertheless generates a spatial zone or realm within its boundaries.

虽然有连续不断的空间流穿越其间，但无论如何，该领域会在它的边界内产生一个空间区域或空间地带。

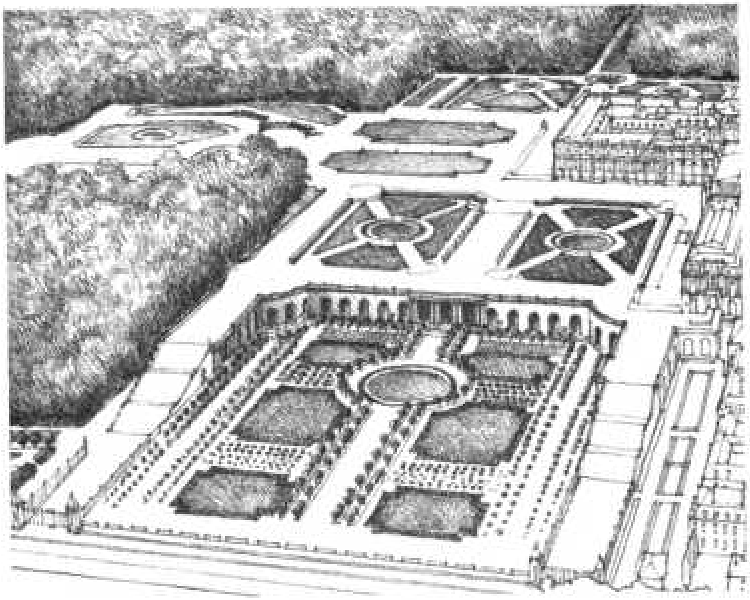


The surface articulation of the ground or floor plane is often used in architecture to define a zone of space within a larger context. The examples on the facing page illustrate how this type of spatial definition can be used to differentiate between a path of movement and places of rest, establish a field from which the form of a building rises out of the ground, or articulate a functional zone within a one-room living environment.

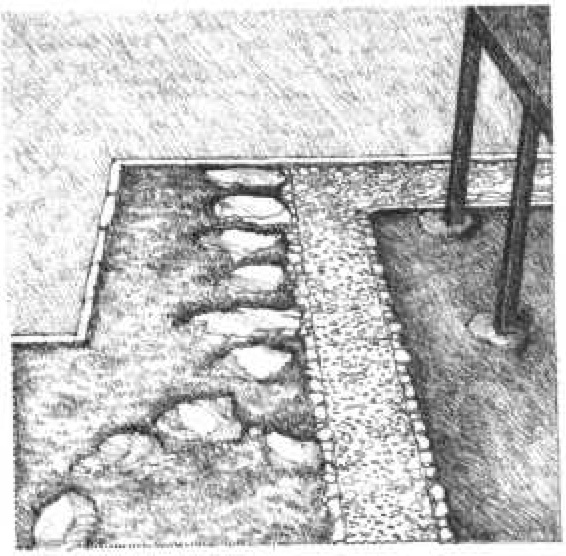
在建筑中，地面或楼面上的清晰轮廓常常用来在更大的背景中限定一个空间区域。下一页的实例清楚地表明，这类限定空间的方法是如何用来区分行动路线和休息区域，如何在建筑形体拔地而起的地方建立起一个领域，或者如何在一个房间的起居环境中明确地划分出一个功能区。



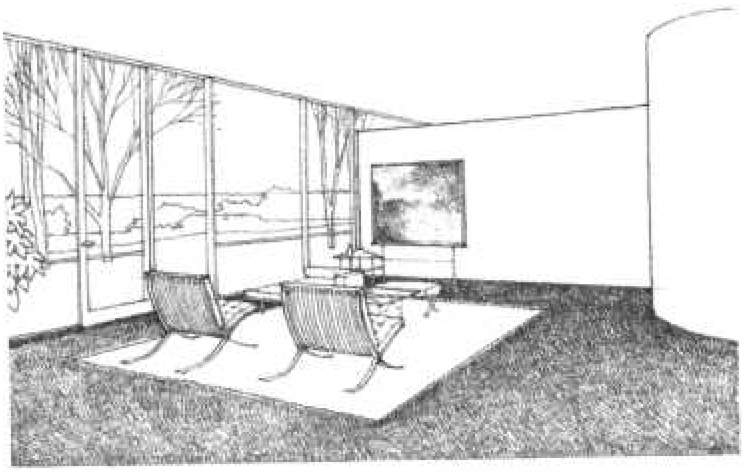
Street in Woodstock, Oxfordshire, England
伍德斯托克的街道，牛津郡，英格兰



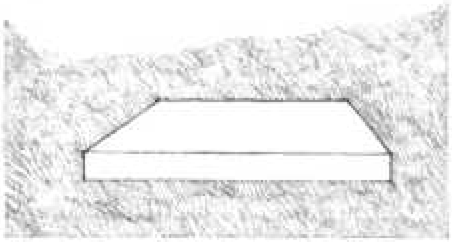
Parterre de Broderie, Versailles, France, 17th century, André Le Nôtre
布洛德莱花坛，凡尔赛，法国，17世纪，A. 勒诺特尔

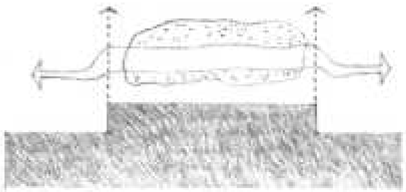


Katsura Palace, Kyoto, Japan, 17th century
桂离宫，京都，日本，17世纪



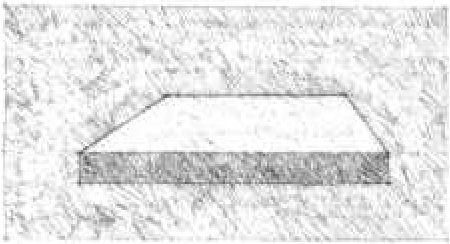
Interior of *Glass House*, New Canaan, Connecticut, 1949, Philip Johnson
玻璃住宅室内，新迦南，康涅狄格州，1949年，P. 约翰逊

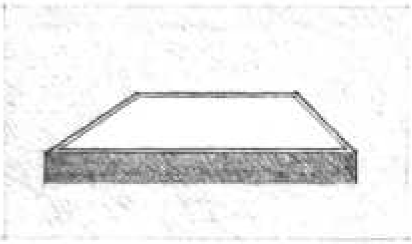




Elevating a portion of the base plane creates a specific domain within a larger spatial context. The changes in level that occur along the edges of the elevated plane define the boundaries of its field and interrupts the flow of space across its surface.

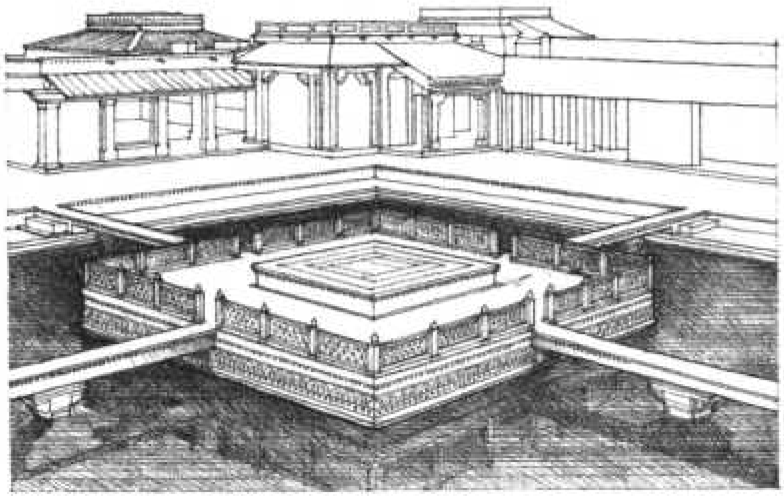
抬高基面的一部分，将在更大的空间范畴内创造一个特定的空间领域。沿着抬高了的平面边缘所发生的高度变化，限定了其领域的界限并打断了穿过其表面的空间流。





If the surface characteristics of the base plane continues up and across the elevated plane, then the field of the elevated plane will appear to be very much a part of the surrounding space. If, however, the edge condition is articulated by a change in form, color, or texture, then the field will become a plateau that is separate and distinct from its surroundings.

如果基面抬高所形成的侧表面继续向上伸展，并超过了已经抬高的基面，那么抬高了的基面所限定的范围，看起来很像周围空间的一部分。然而，如果边界在形式、色彩或质感等方面发生了明确的变化，那么这个范围便成为一块高地，与周围环境分离且区别明显。

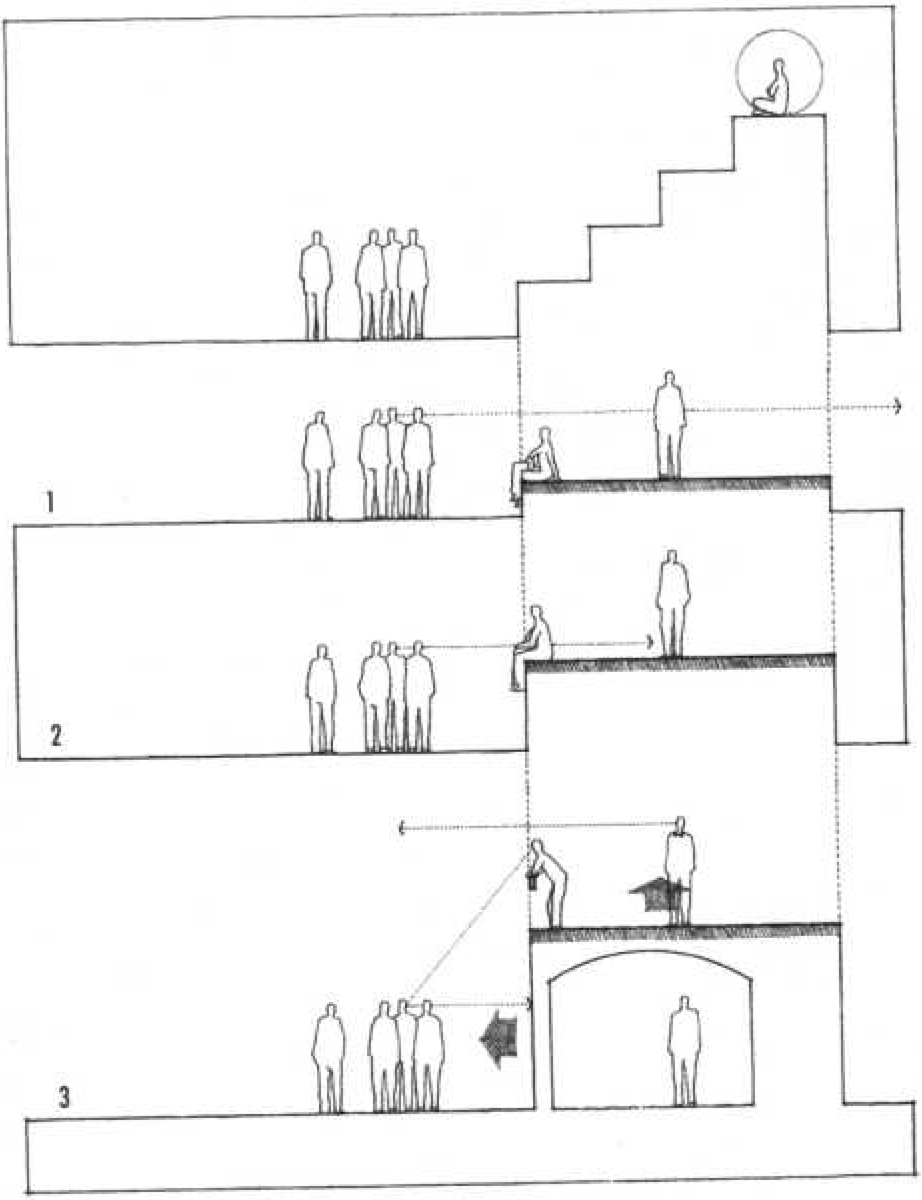


Fatehpur Sikri, *Palace Complex of Akbar the Great Mogul Emperor of India, 1569–1574.*
A special place is established by a platform in an artificial lake surrounded by the emperor's living and sleeping quarters.

费特普·斯克里，印度莫卧儿大帝阿克巴的宫殿综合体，1569年—1574年
人工湖上的一座平台构成了一处特殊的场所，周围环绕着皇帝的起居与就寝处。

The degree to which spatial and visual continuity is maintained between an elevated space and its surroundings depends on the scale of the level change.

在抬高的空间与周围环境之间，空间与视觉上的连续程度取决于高程变化的尺度。



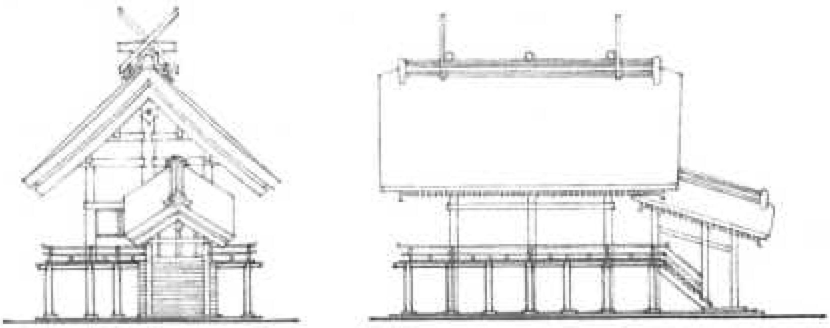
1. The edge of the field is well-defined; visual and spatial continuity is maintained; physical access is easily accommodated.
   领域的界限得到很好的界定；
   视觉与空间的连续性依然保持；
   身体很容易接近。

2. Visual continuity is maintained; spatial continuity is interrupted; physical access requires the use of stairs or ramps.
   视觉连续性尚存；
   空间连续性被打断；
   身体接近则需要利用楼梯或坡道。

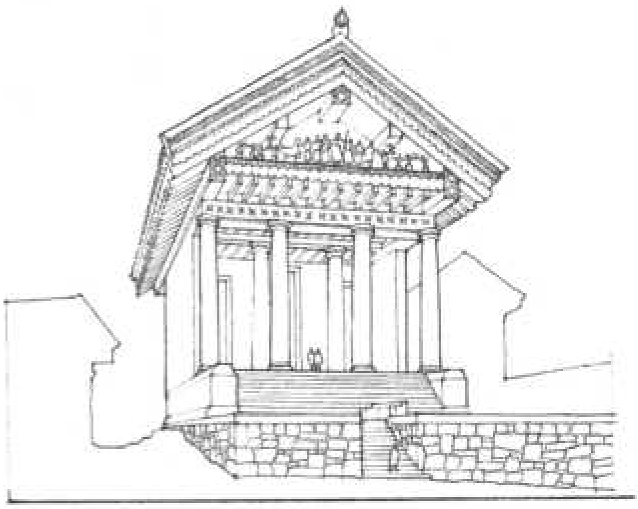
3. Visual and spatial continuity is interrupted; the field of the elevated plane is isolated from the ground or floor plane; the elevated plane is transformed into a sheltering element for the space below.
   视觉与空间的连续性均被打断；
   抬高的基面所限定的区域已经与地面或楼板分离；
   抬高的基面演变成下面空间的遮蔽要素。



The Acropolis, the citadel of Athens, 5th century B.C.
卫城，雅典城堡，公元前5世纪



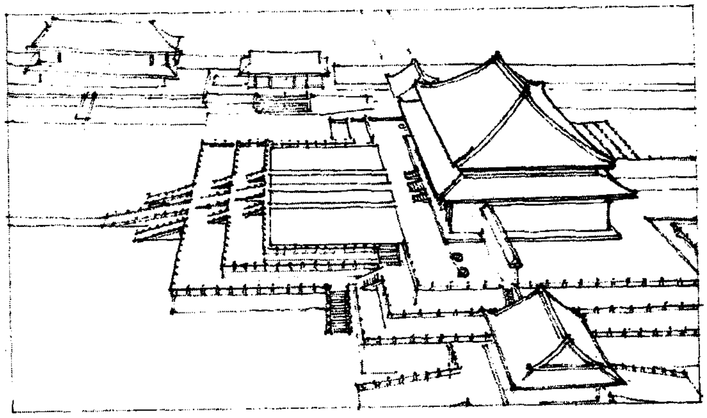
Izumo Shrine, Shimane Prefecture, Japan, A. D. 717 (last rebuilt in in 1744)
出云大社，岛根县，日本，717年（最后一次复建是在1744年）

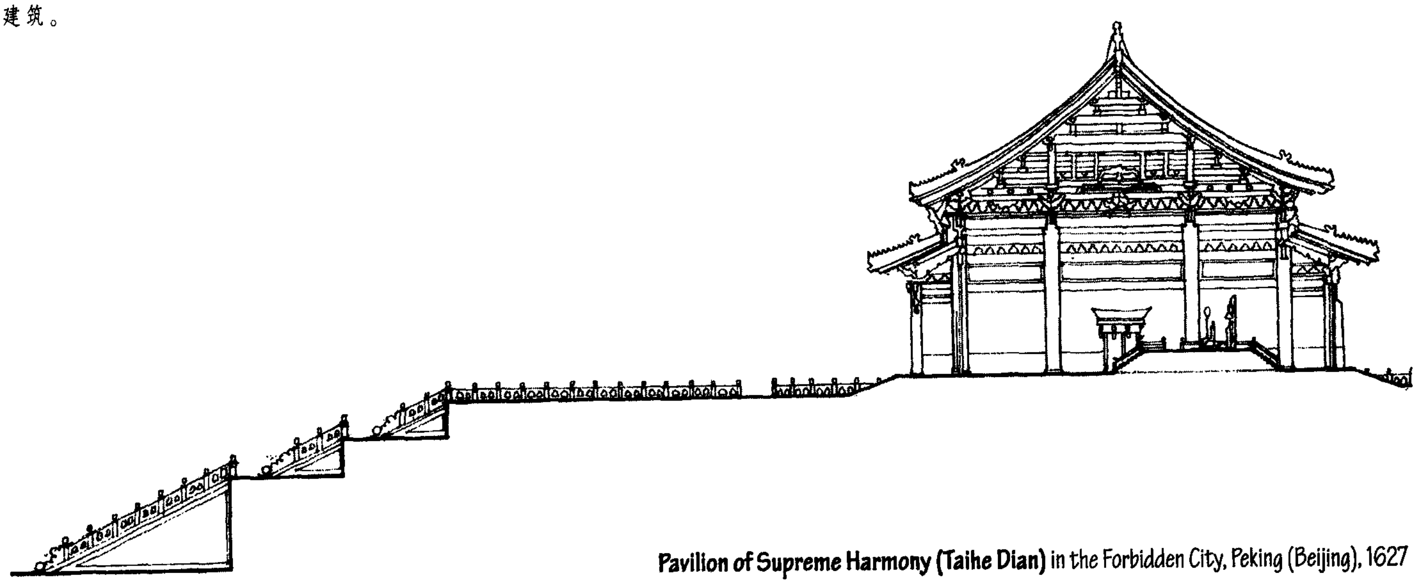


Temple of Jupiter Capitolinus, Rome, 509 B.C.
朱庇特神庙，罗马，公元前509年

Elevating a portion of the ground plane establishes a platform or podium that structurally and visually supports the form and mass of a building. The elevated ground plane can be a preexisting site condition, or it can be artificially constructed to deliberately raise a building above the surrounding context or enhance its image in the landscape. The examples on these two pages illustrate how these techniques have been used to venerate sacred and honorific buildings.

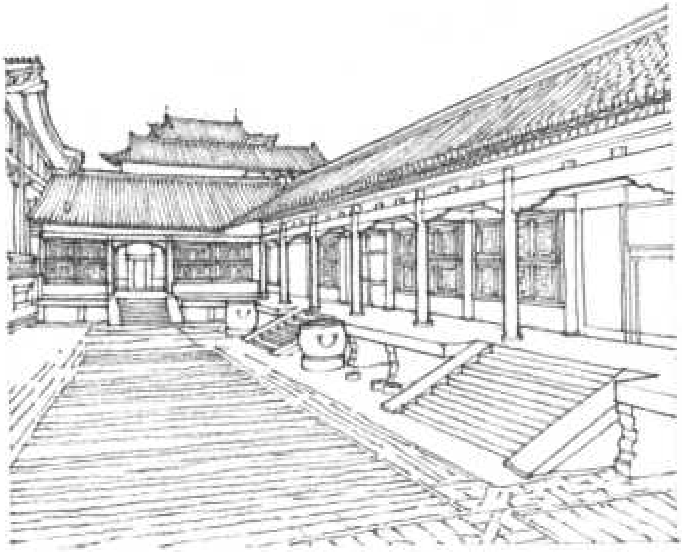
地面的一部分升起来就形成了一个平台或墩座。从结构上或视觉上来看，这个平台或墩座都支撑着建筑的体量与形式。抬高的地面可以是已经存在的基地条件，也可以人工建造，目的是有意抬高建筑使其高于周围环境或者强化其在地景中的形象。这两页上的实例说明了如何把这些技法用于表现神圣与庄严的建筑。

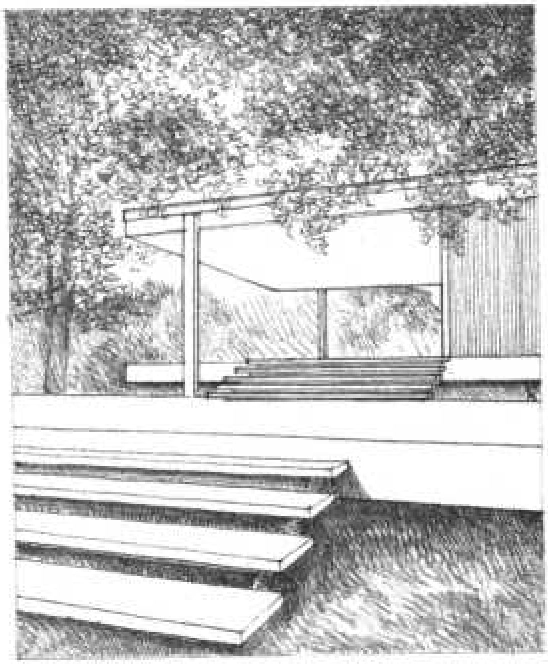




Pavilion of Supreme Harmony (Taihe Dian) in the Forbidden City, Peking (Beijing), 1627

太和殿，紫禁城，北京，1627年



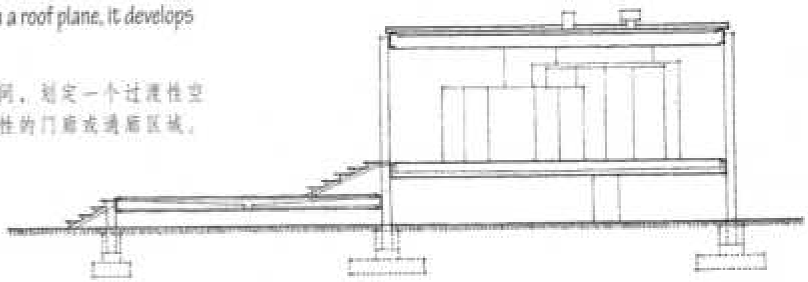


Private Courtyard of the Imperial Palace, the Forbidden City, Peking (Beijing), 15th century

皇宫中的私密庭院，紫禁城，北京，15世纪

An elevated plane can define a transitional space between the interior of a building and the outdoor environment. Combined with a roof plane, it develops into the semiprivate realm of a porch or veranda.

一个抬高的平面可以在建筑室内和室外环境之间，划定一个过渡性空间。抬高的基面与屋面相结合，发展成半私密性的门廊或遮廊区域。

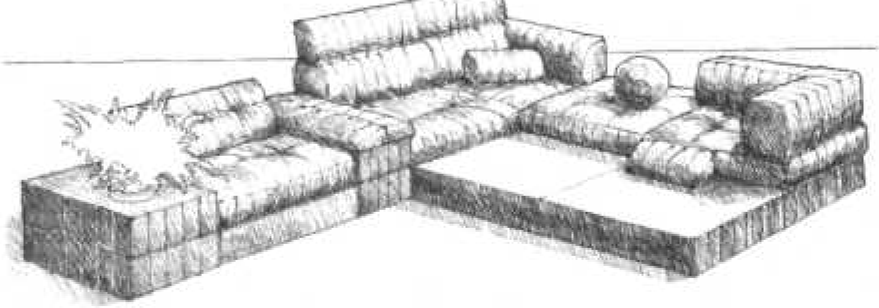


Section of the Farnsworth House, Plano, Illinois, 1950, Mies van der Rohe.

The Farnsworth House was constructed to rise above the flood plain of the Fox River. This elevated floor plane, together with an overhead roof plane, defines a volume of space that hovers delicately above the surface of its site.

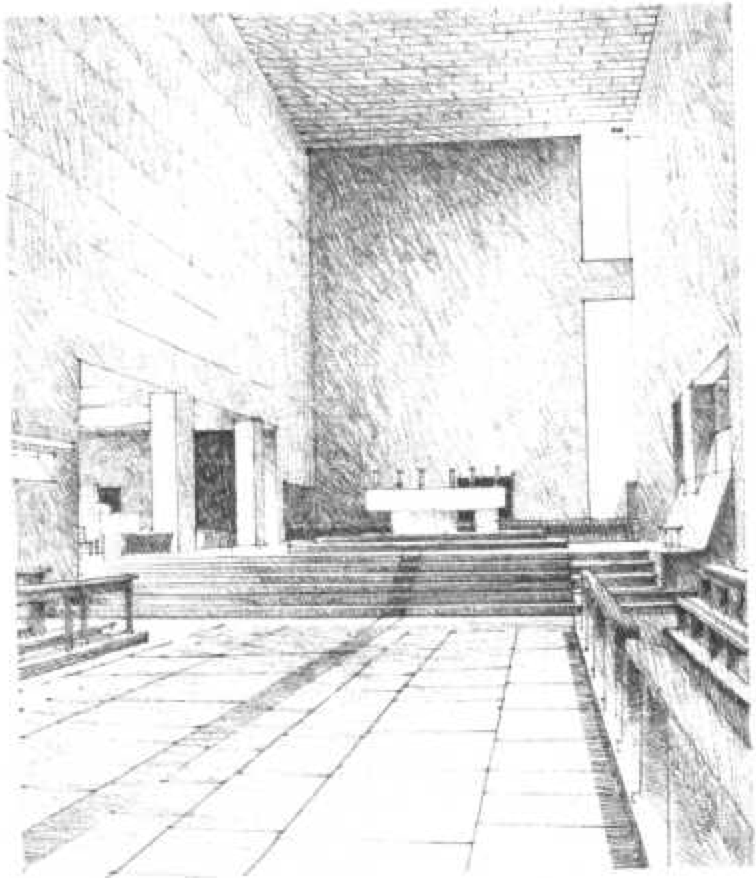
范斯沃斯住宅剖面，普莱诺，伊利诺斯州，1950年，密斯·凡德罗

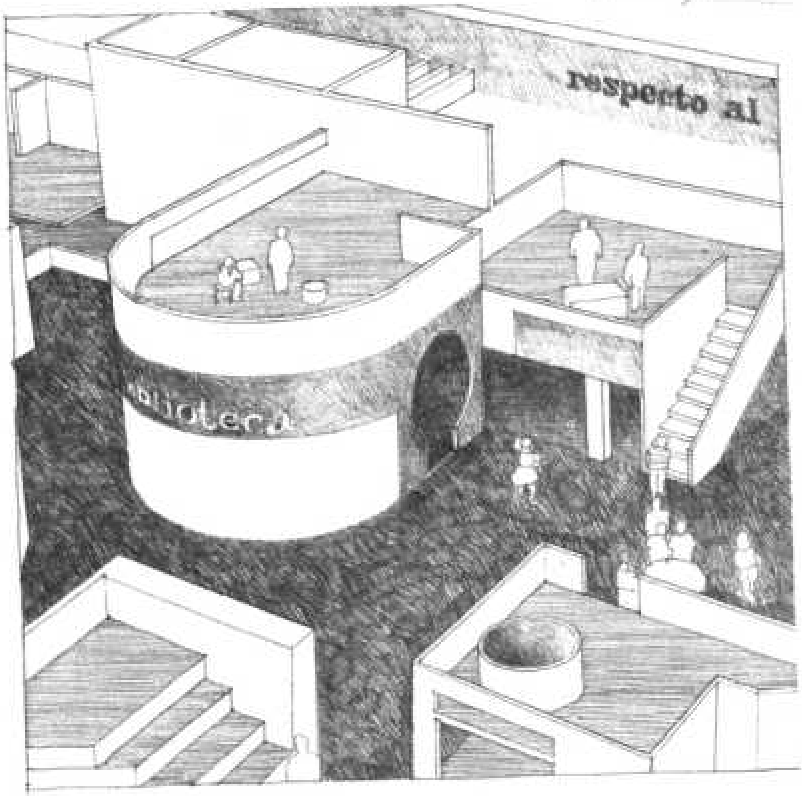
范斯沃斯住宅建在福克斯河的洪水冲积平原之上。这个抬高的地面与头顶上的屋面一起限定了一个空间的容积，这个容积巧妙地悬浮于基地表面之上。



High Altar in the Chapel at the Cistercian Monastery of La Tourette, near Lyons, France, 1956–1959, Le Corbusier

拉土雷修道院礼拜堂中的高祭坛，里昂附近，法国，1956年—1959年，勒·柯布西埃



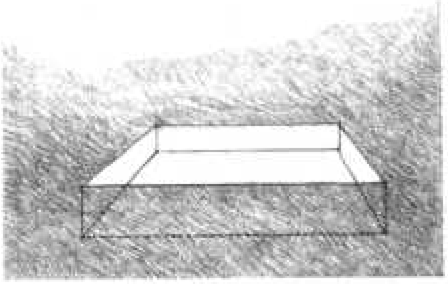


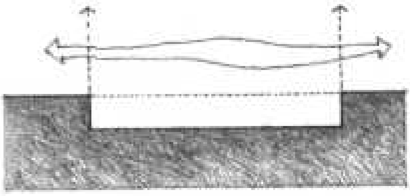
A section of the floor plane can be elevated to establish a singular zone of space within a larger room or hall. This raised space can serve as a retreat from the activity around it or be a platform for viewing the surrounding space. Within a religious structure, it can demarcate a sacred, holy, or consecrated place.

在一个较大的房间或厅堂中，可以抬高楼面的一部分来产生一块独特的空间区域。这块抬高的空间可以当作逃避周围活动的休息处或者作为一个平台观看周围的空间。在一个宗教建筑中，抬高的空间能够划分出庄严的、神圣的或祭祀的空间。

East Harlem Preschool, New York City, 1970, Hammel, Green & Abrahamson

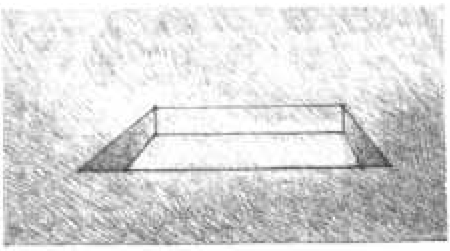
东哈里姆学龄前学校，纽约市，1970年，哈梅尔，格林和亚伯拉罕森

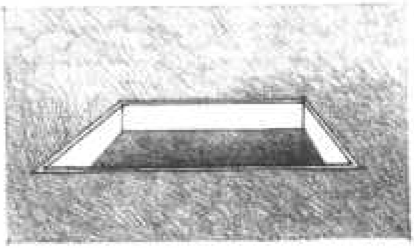




Lowering a portion of the base plane isolates a field of space from a larger context. The vertical surfaces of the depression establish the boundaries of the field. These boundaries are not implied as in the case of an elevated plane, but visible edges that begin to form the walls of the space.

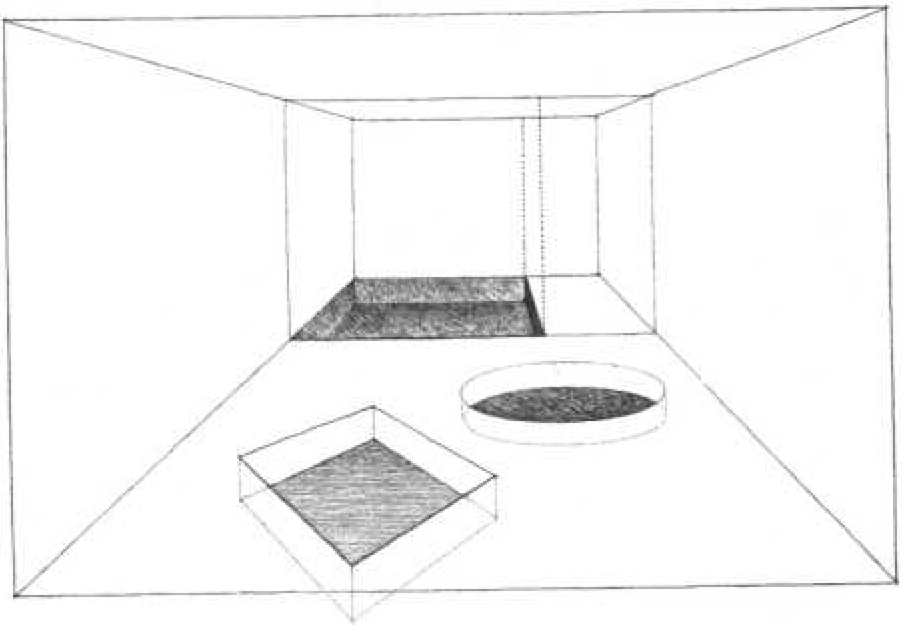
基面的一部分下沉，可以在较大的背景中分离出一块空间区域。基面下沉形成的垂直表面则形成该区域的界限。这些界限与基面抬起的情况不一样，而是可见的边缘并开始形成空间的墙。





The field of space can be further articulated by contrasting the surface treatment of the lowered area and that of the surrounding base plane.

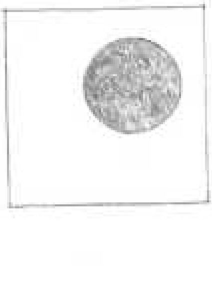
通过处理，下沉部分的表面与周围基面形成对比，能够进一步明确这一空间领域。

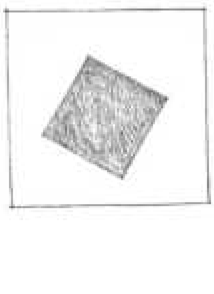


A contrast in form, geometry, or orientation can also visually reinforce the identity and independence of the sunken field from its larger spatial context.

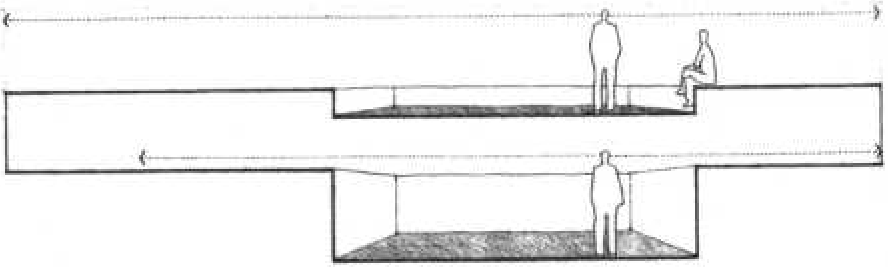
形式、几何特点或方位的对比，也能够在视觉上加强下沉部分在大空间背景中的可识别性和独立性。



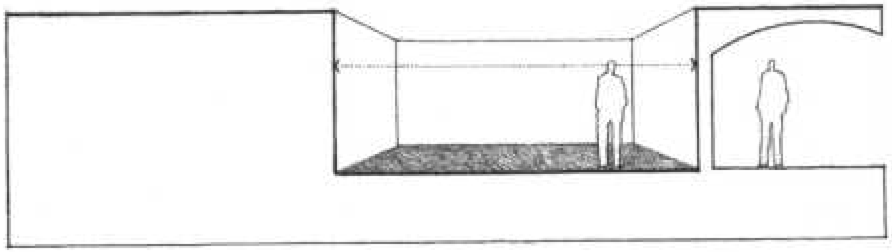




The degree of spatial continuity between a depressed field and the raised area surrounding it depends on the scale of the level change.
下沉区域和高起地带周围之间的连续性，取决于高程变化的尺度。

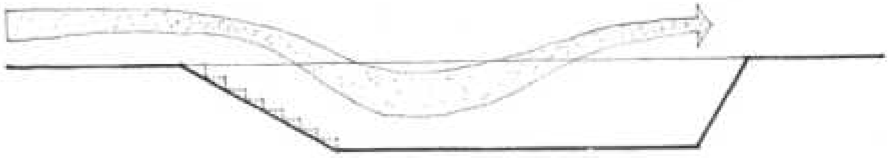


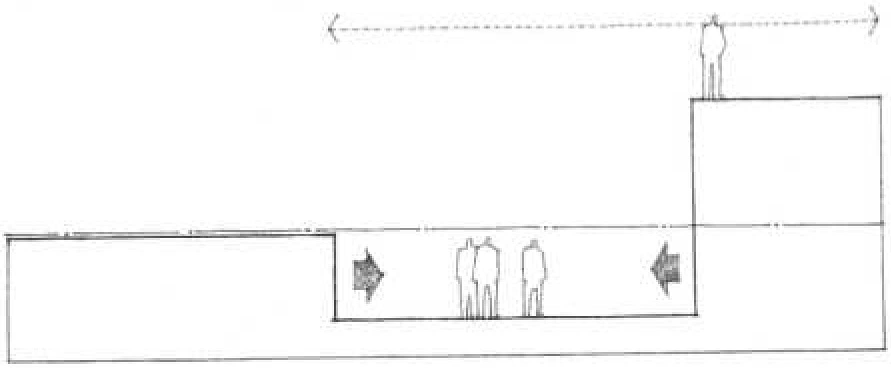
- The depressed field can be an interruption of the ground or floor plane and remain an integral part of the surrounding space.
  下沉区域可以中断地面或楼面，但依然保持为周围整体空间的一部分。
- Increasing the depth of the depressed field weakens its visual relationship with the surrounding space and strengthens its definition as a distinct volume of space.
  增加下沉区域的深度，会削弱这部分与周围空间的关系，同时加强这一区域作为独立空间容积的明确性。



- Once the original base plane is above our eye-level, the depressed field becomes a separate and distinct room in itself.
  一旦原来的基面高出我们的视平面时，下沉区域本身会变成一个独立而特别的空间。

Creating a stepped, terraced, or ramped transition from one level to the next helps promote continuity between a sunken space and the area that rises around it.
从一个高程到另一个高程，创造一种阶梯状的、台地式的或坡道式的转换，有助于增进下沉空间和周围高起区域之间的连续性。





Whereas the act of stepping up to an elevated space might express the extroverted nature or significance of the space, the lowering of a space below its surroundings might allude to its introverted nature or to its sheltering and protective qualities.
由于踏上一个抬高的空间可以表现空间的外向性或空间的重要性，那么低于其周围环境的下沉空间则暗示着空间的内向性或空间的庇护与保护的特点。





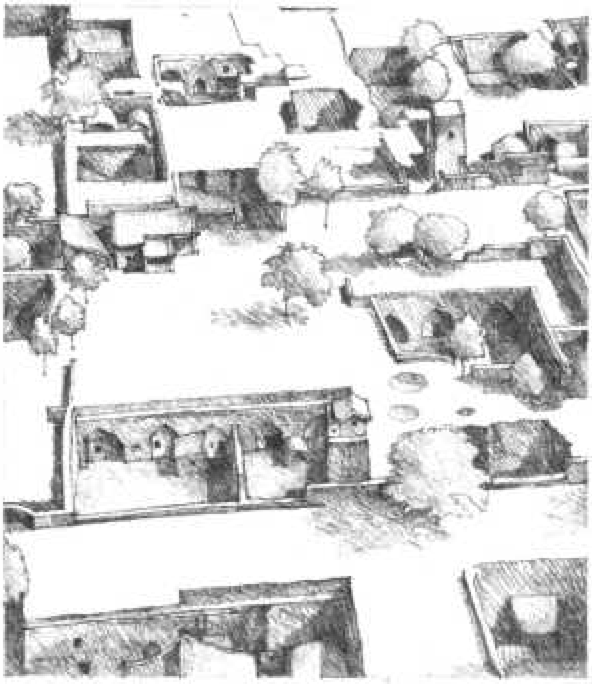


Theater at Epidauros, *Greece, c. 350 B.C., Polycleitos*
埃皮狄亚罗斯的剧场，希腊，公元前350年，波利克雷特斯

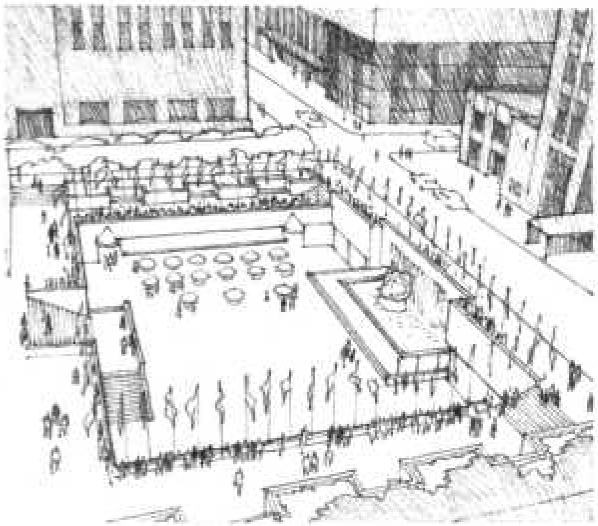
Depressed areas in the topography of a site can serve as stages for outdoor arenas and amphitheaters. The natural change in level benefits both the sightlines and the acoustical quality of these spaces.

基地地貌下沉的地带，可以作为露天剧场或竞技场的舞台。高程的自然变化使这些空间在视线和声学效果方面均有收益。



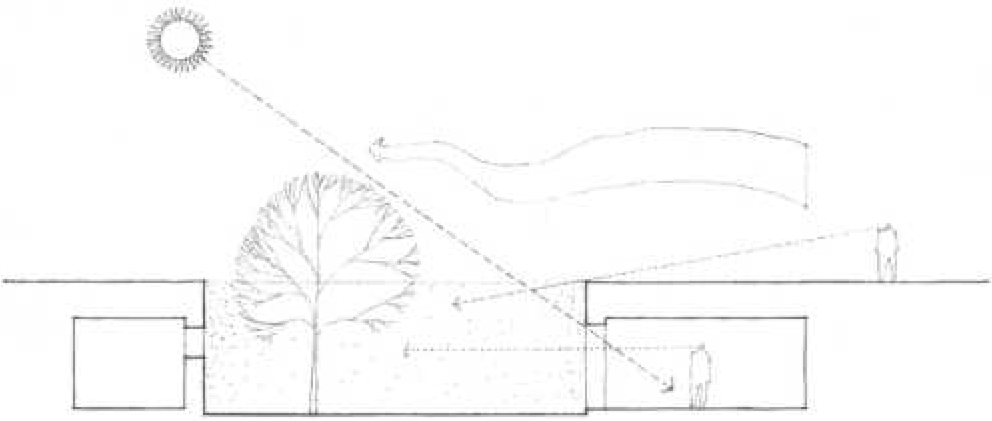


Underground village near Loyang, China
洛阳附近的地下窑洞，中国



Lower Plaza, Rockefeller Center, New York City, 1930, Wallace K. Harrison & Max Abramovitz.
Rockefeller Center's lower plaza, an outdoor cafe in the summertime and a skating rink in the winter, can be viewed from the upper plaza while shops open onto it at the lower level.

下沉广场，洛克菲勒中心，纽约市，1930年，W.K.哈里森与M.阿伯拉莫维兹
洛克菲勒中心的下沉广场，在夏季是一个露天咖啡座，在冬季是滑冰场，人们可以从上面的广场看到这个下沉广场。同时，位于低处的商店也开向下沉广场。

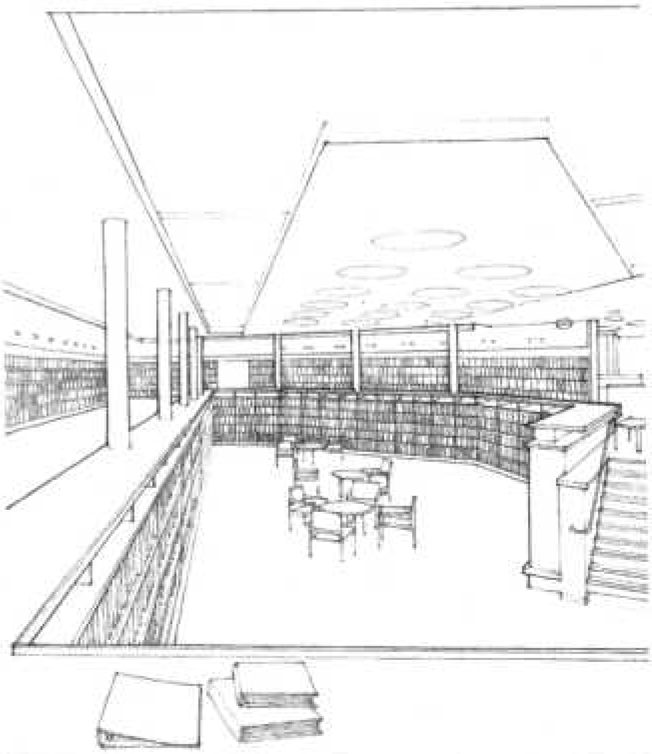


The ground plane can be lowered to define sheltered outdoor spaces for underground buildings. A sunken courtyard, while protected from surface-level wind and noise by the mass surrounding it, remains a source of air, light, and views for the underground spaces opening onto it.

下沉的地面限定出供地下建筑使用的、可以遮风避雨的室外空间。下沉的庭院，可以用周围的体量来阻隔地表的风和噪声，同时为朝向庭院的地下空间提供空气、采光和景观。

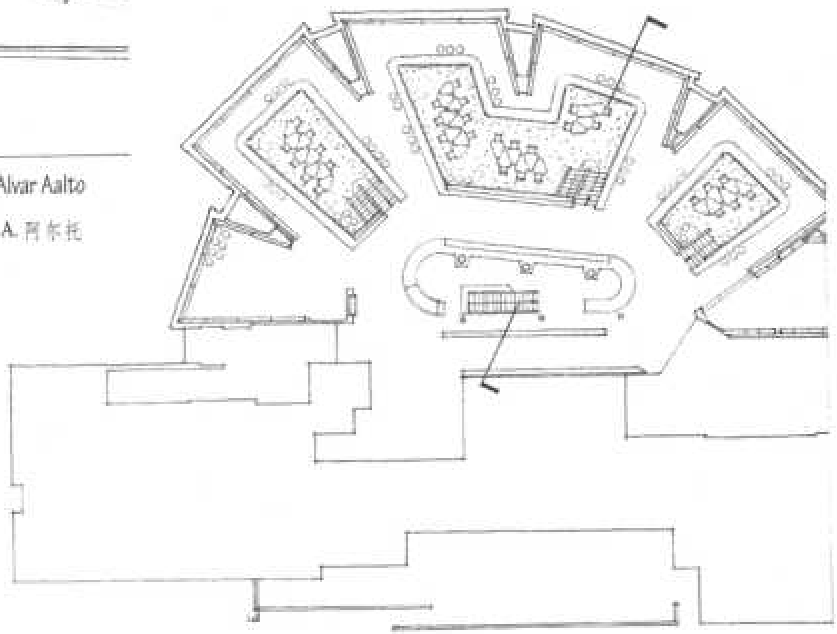
In both of these examples, Alvar Aalto has defined a reading area within a larger library space by dropping its floor plane below the main level of the library. He then uses the vertical bounding surfaces of the reading area for additional book storage.

在这些实例中，A. 阿尔托把阅览部分的楼面降到图书馆主要标高之下，从而在较大范围的图书馆中限定出一个阅读区域。然后，他利用阅览区域的垂直表面作为附加的藏书空间。



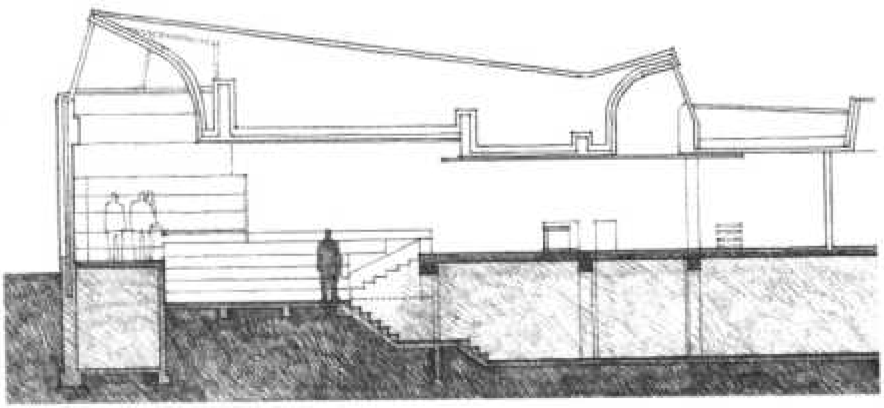
Library, Wolfsburg Cultural Center, Essen, Germany, 1962, Alvar Aalto

图书馆，沃尔夫斯伯格文化中心，埃森，德国，1962年，A. 阿尔托



Partial Plan, Library in Rovaniemi, Finland, 1965–1968, Alvar Aalto

平面局部，洛瓦涅米图书馆，芬兰，1965年—1968年，A. 阿尔托

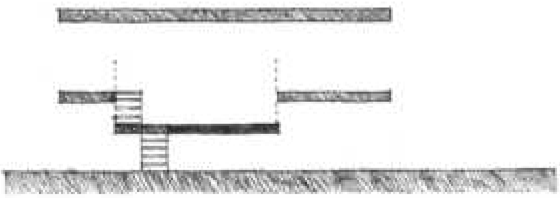


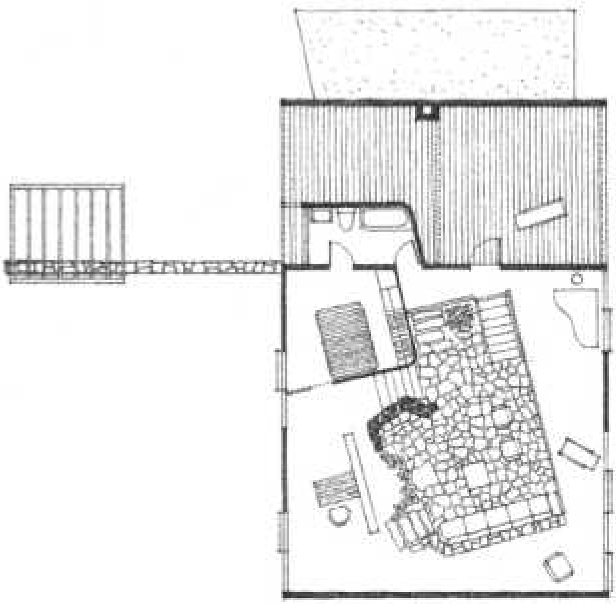
Partial Section

through the main reading room

剖面局部

通过主要阅览室的剖面



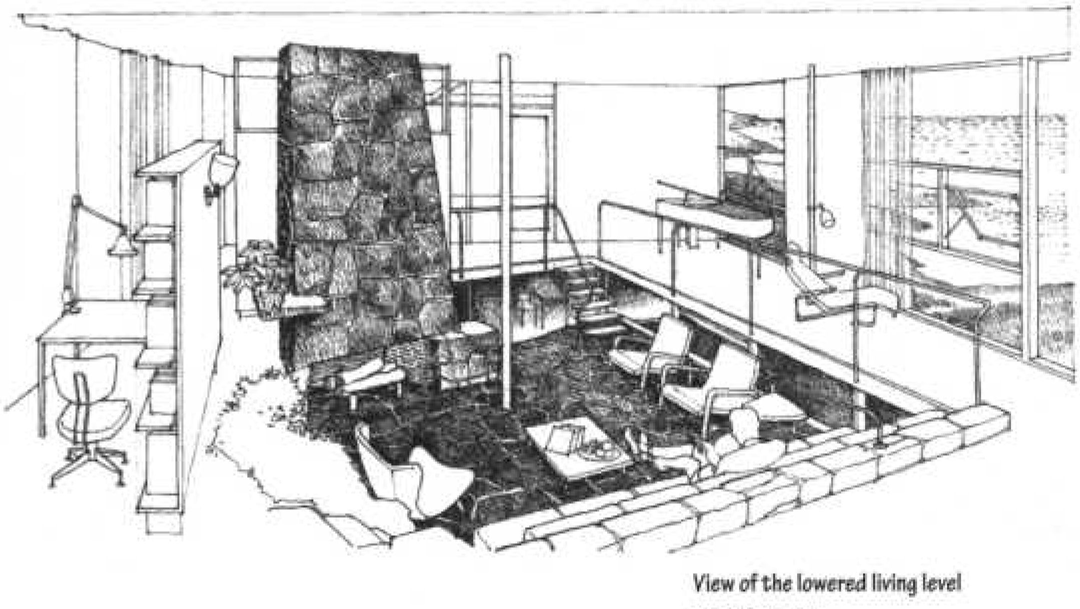


House on the Massachusetts Coast, 1948, Hugh Stubbins

马萨诸塞州海滨住宅，1948年，H. 斯塔宾斯

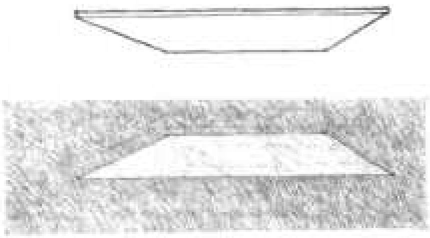
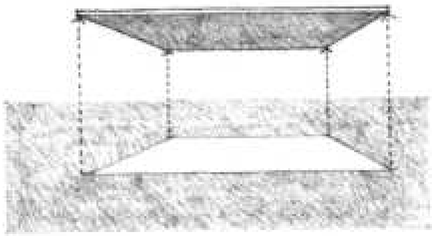
An area within a large room can be sunken to reduce the scale of the room and define a more intimate space within it. A sunken area can also serve as a transitional space between two floors of a building.

在一个大房间内，可将局部下沉以减小房间的尺度，并在其中限定一个更为亲切的空间。一个下沉区域，也可以作为建筑物两层楼板之间的过渡空间。



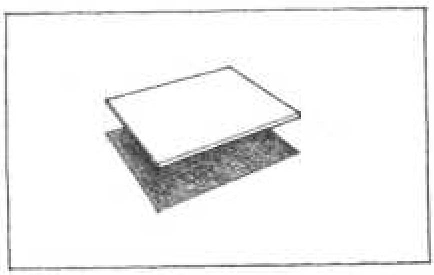
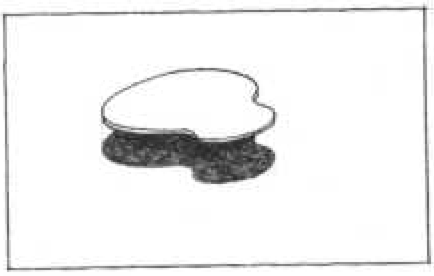
View of the lowered living level

下沉起居层景观

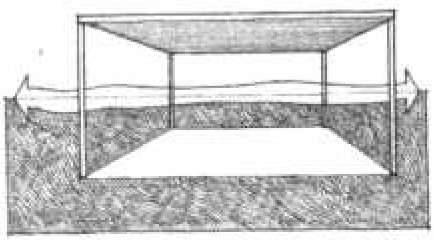
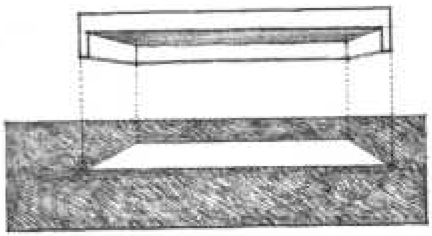
Similar to the manner in which a shade tree offers a sense of enclosure beneath its umbrella structure, an overhead plane defines a field of space between itself and the ground plane. Since the edges of the overhead plane establish the boundaries of this field, its shape, size, and height above the ground plane determines the formal qualities of the space.

正如一棵枝叶茂盛的树，在其伞形结构下提供了某种围护，顶面在其本身和地面之间限定出一个空间区域。由于顶面的边缘是这一区域的界限，所以顶面的形状、大小以及离地面的高度决定了该空间的形式特征。

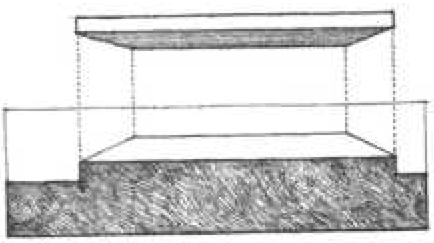
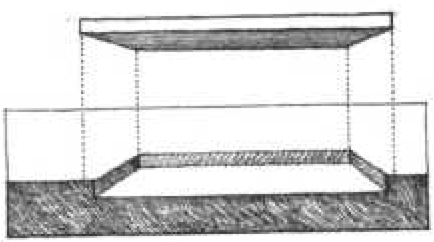
While the previous manipulations of the ground or floor plane defined fields of space whose upper limits were established by their context, an overhead plane has the ability to define a discrete volume of space virtually by itself.

先前所说的那些对于地面或楼面的处理，虽然限定了空间区域，但这些空间区域的上部边界是由其环境决定的，而顶面则具有限定离散空间容积的能力，并且这种限定主要依靠其自身。

If vertical linear elements such as columns or posts are used to support the overhead plane, they will aid in visually establishing the limits of the defined space without disrupting the flow of space through the field.

如果垂直的线要素（如柱子或杆件）用以支撑顶面，那么它们将有助于在视觉上建立所限定空间的界限，而不会打断穿越这一区域的空间流。

Similarly, if the edges of the overhead plane are turned downward, or if the base plane beneath it is articulated by a change in level, the boundaries of the defined volume of space will be visually reinforced.

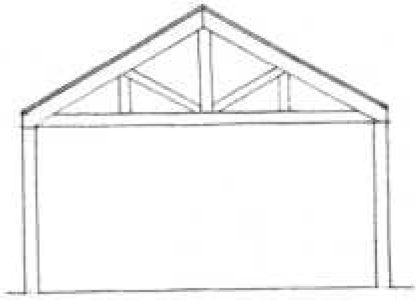
同样，如果顶面的边界向下翻，或者顶面下的基面的高程有明显的变化，那么所限定的空间容积的边界将会在视觉上得到加强。



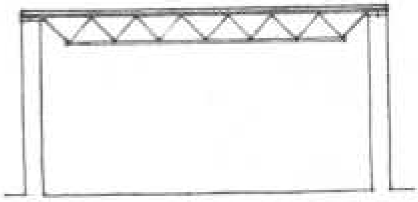
Moving the roof of a house in Guinea
几内亚人在移动一个住宅的屋顶

The major overhead element of a building is its roof plane. It not only shelters the interior spaces of a building from sun, rain, and snow, but also has a major impact on the overall form of a building and the shaping of its spaces. The form of the roof plane, in turn, is determined by the material, geometry, and proportions of its structural system and the manner in which it transfers its loads across space to its supports.

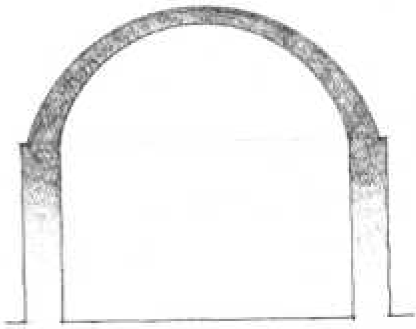
建筑物的主要顶部要素是它的屋面。屋面不仅可以保护建筑物的室内空间免受日晒和雨雪的侵袭，而且对于建筑物的总体形式以及塑造其空间具有主要影响。因此，屋面的形式决定于其结构体系的材料、几何形状、比例，以及结构体系将荷载穿越空间传到其支撑构件上的传力方式。



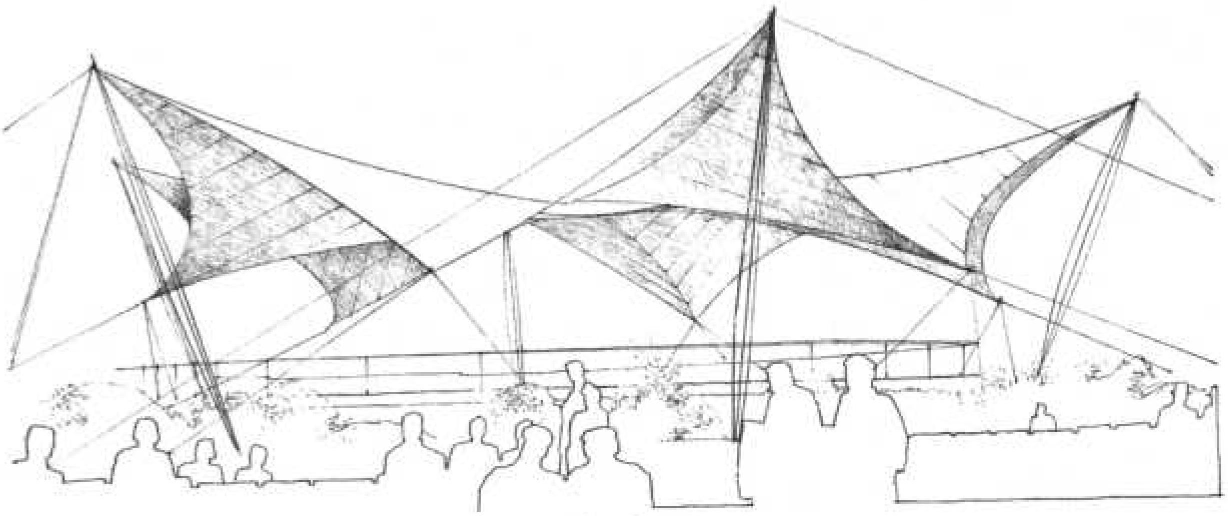
Wood Truss
木桁架



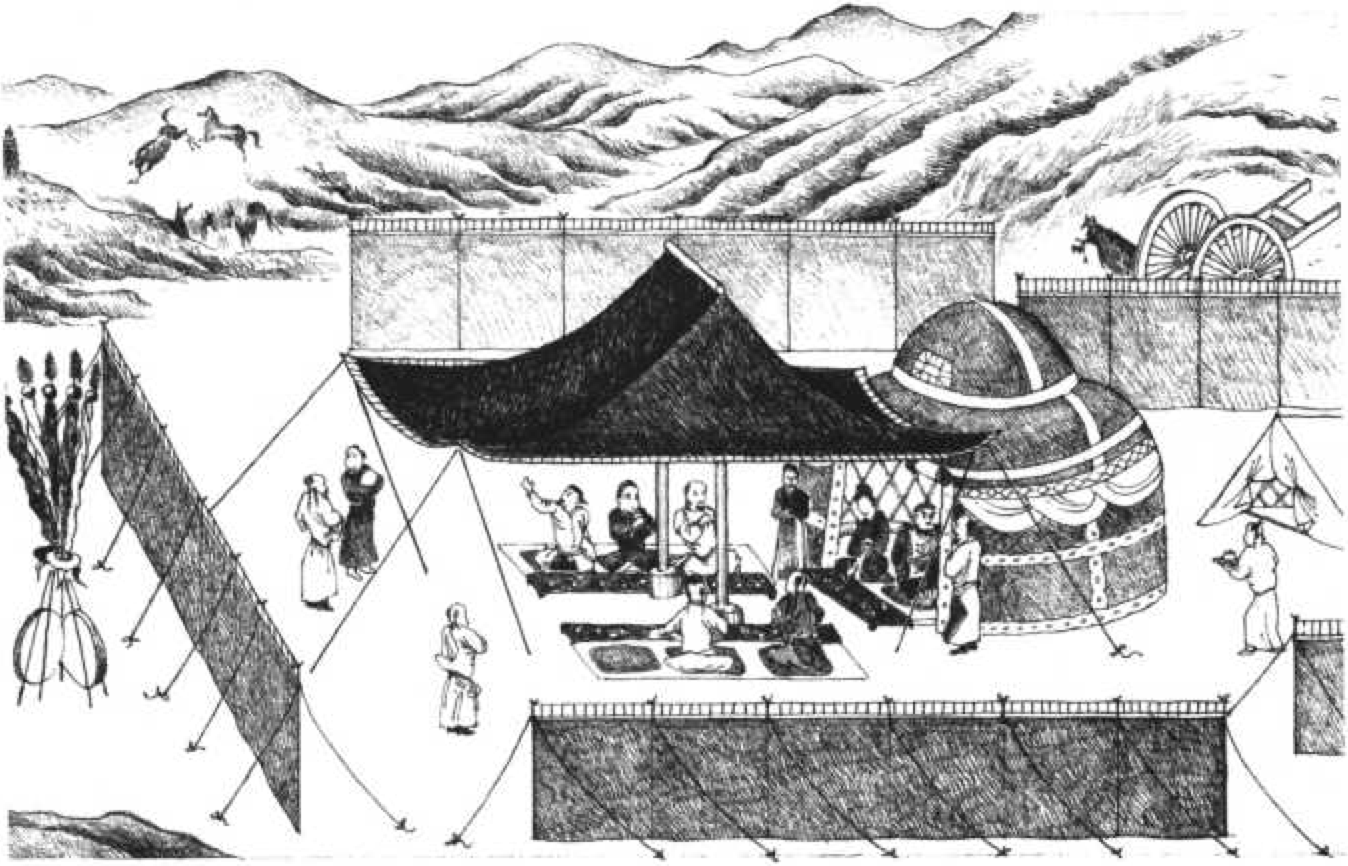
Steel Joist
钢托梁



Masonry Vault
砌筑穹顶

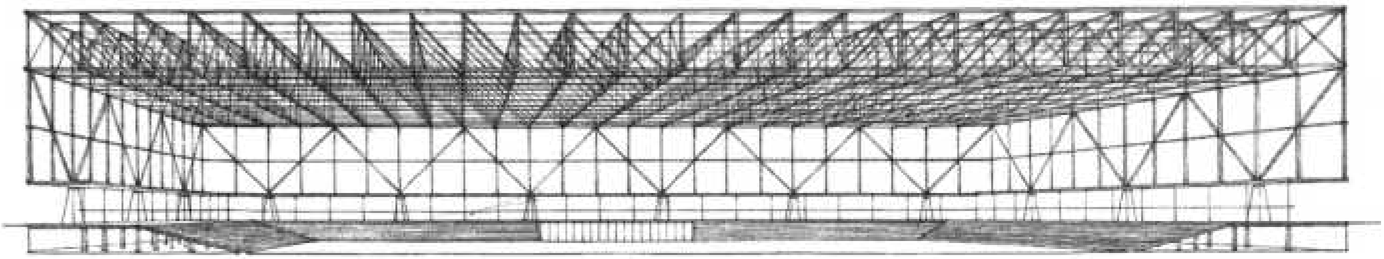


Tensile Structure, National Garden Show, Cologne, Germany, 1957, Frei Otto and Peter Stromeyer
张拉结构，国家公园展示场，科隆，德国，1957年，F.奥托和P.斯托梅耶



Chinese painting illustrating the use of a pavilion structure to define a shaded resting place within an encampment.

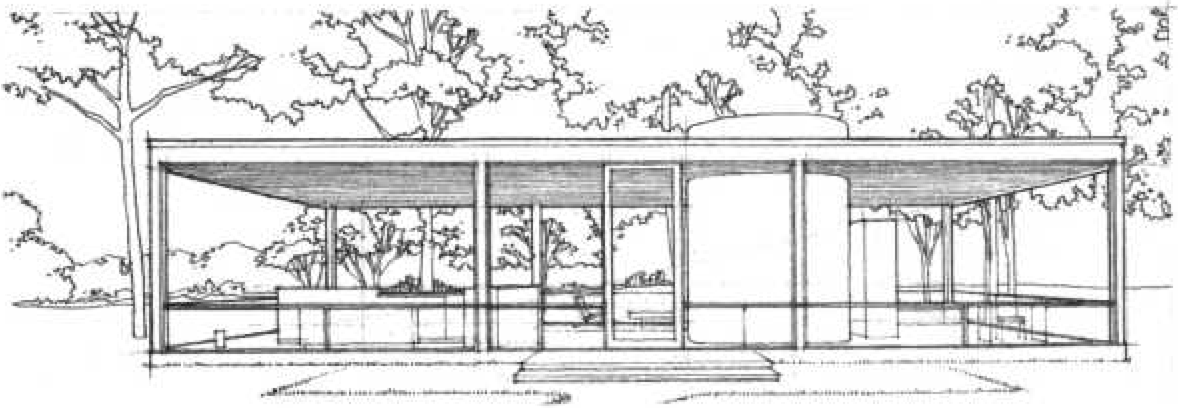
这幅中国画说明，运用帐篷结构在营地上限定一个纳凉的休息场所。



The roof plane can visually express how its pattern of structural members resolves forces and transfers loads to a system of supports.

屋面可以在视觉上表现出其结构要素所构成的形式是如何分解受力并将荷载传到支撑体系上去的。

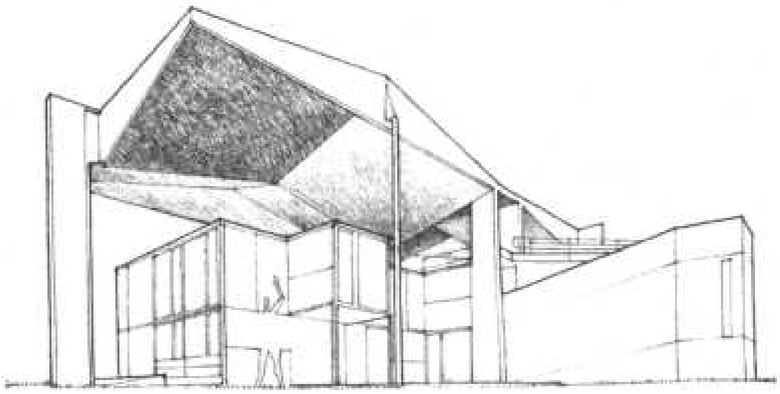
Convention Hall for Chicago (Project), 1953, Mies van der Rohe
芝加哥会议大厅（方案），1953年，密斯·凡德罗



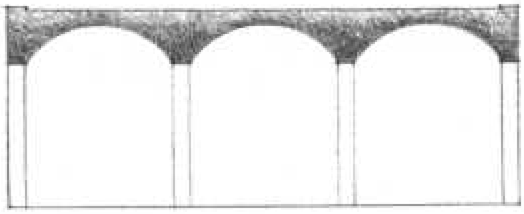
Glass House, New Canaan, Connecticut, 1949, Philip Johnson
玻璃住宅，新坎南，康涅狄格州，1949年，P. 约翰逊

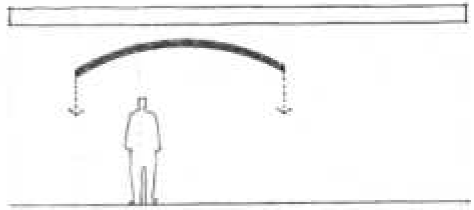
The roof plane can be the major space-defining element of a building and visually organize a series of forms and spaces beneath its sheltering canopy.

屋面可以是建筑物主要的空间限定要素，并且在其遮风避雨的天棚下，组织起一系列形式与空间。



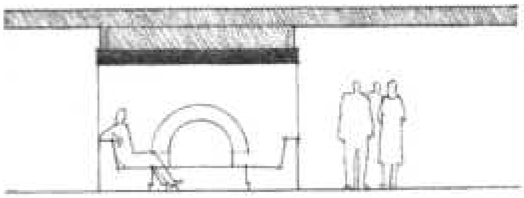
Centre Le Corbusier, Zurich, 1963–1967, Le Corbusier
勒·柯布西埃中心，苏黎世，1963年—1967年，勒·柯布西埃

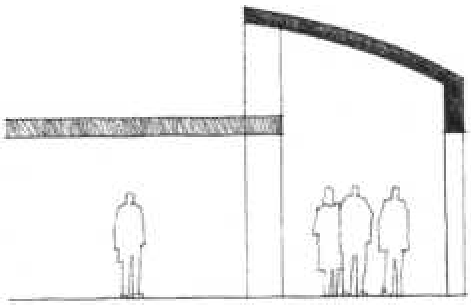




The ceiling plane of an interior space can reflect the form of the structural system supporting the overhead floor or roof plane. Since it need not resist any weathering forces nor carry any major loads, the ceiling plane can also be detached from the floor or roof plane and become a visually active element in a space.

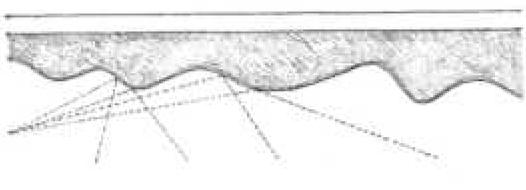
室内空间的顶棚，可以反映支撑上面楼板或屋面的结构体系的形式。由于顶棚不需要防风雨或承担主要的荷载，所以它也可以与楼板或屋面分开，并成为空间中一个活跃的视觉要素。

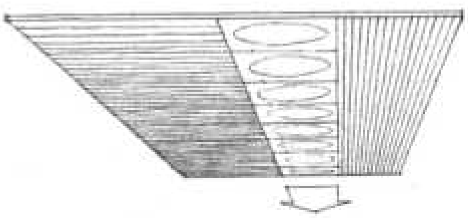




As in the case of the base plane, the ceiling plane can be manipulated to define and articulate zones of space within a room. It can be lowered or elevated to alter the scale of a space, define a path of movement through it, or allow natural light to enter it from above.

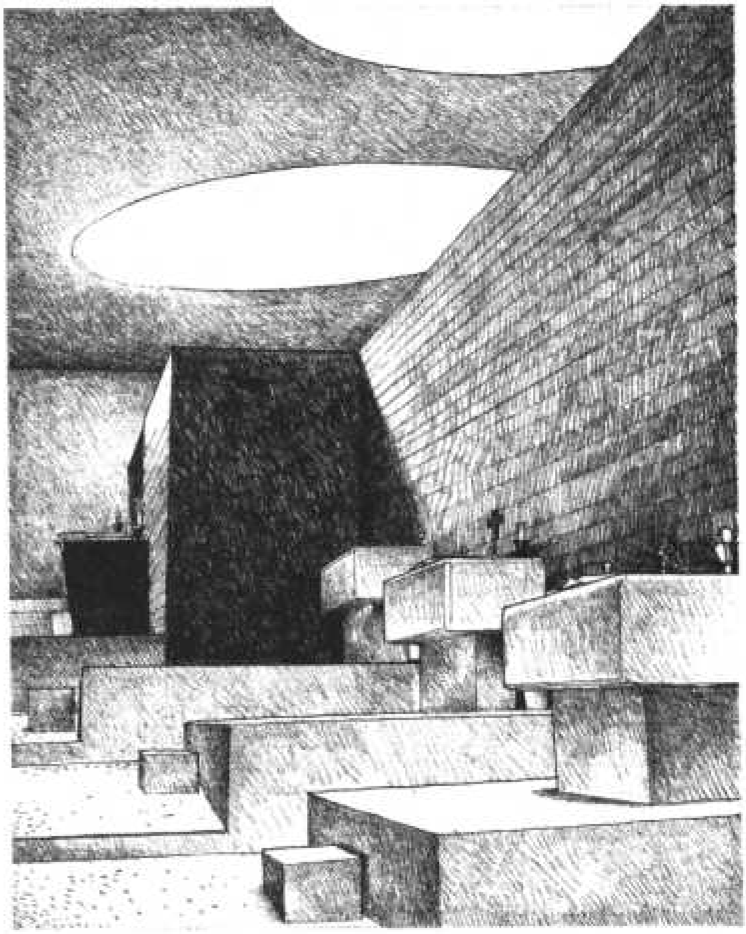
如同基面的情形一样，顶棚可以经过处理来限定和表达一个房间中的各个空间区域。顶棚可以降低或抬高，以改变空间尺度，限定一条穿越其间的运动轨迹，或者让上面的自然光线进入其中。





The form, color, texture, and pattern of the ceiling plane can be manipulated as well to improve the quality of light or sound within a space or give it a directional quality or orientation.

顶棚的形式、色彩、质感和图案，也可以经过处理来改善一个空间中的光学或声学特性，或者使空间具有方向性和方位感。



Side Chapels in the Cistercian Monastery of La Tourette, near Lyons, France, 1956–1959, Le Corbusier

拉土雷修道院的小教堂，里昂附近，法国，1956年—1959年，勒·柯布西埃

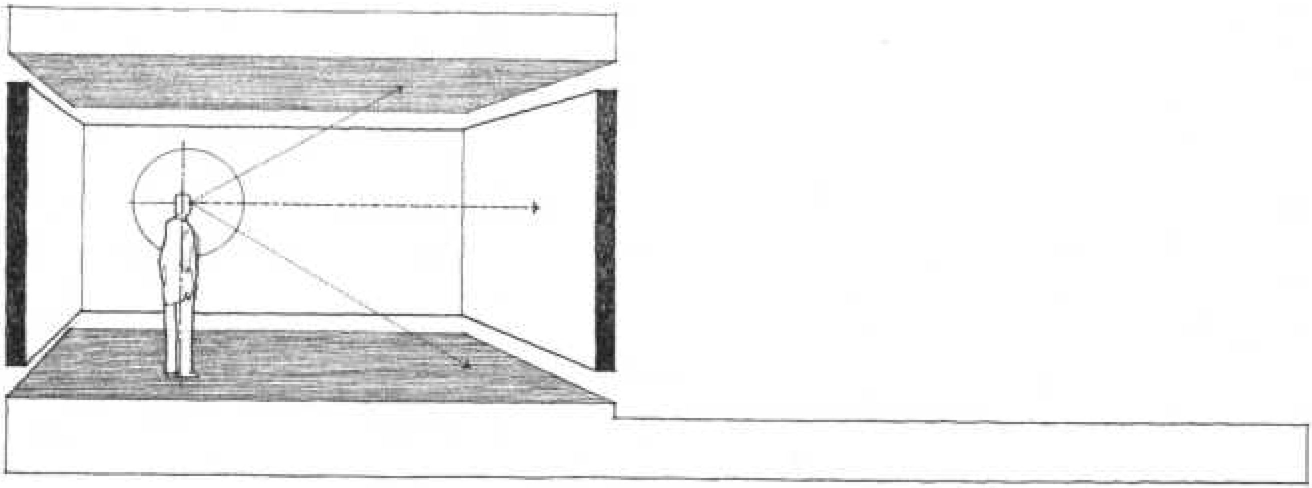
Well-defined negative areas or voids within an overhead plane, such as for skylights, can be seen as positive shapes that establish the presence of spatial fields below their openings.

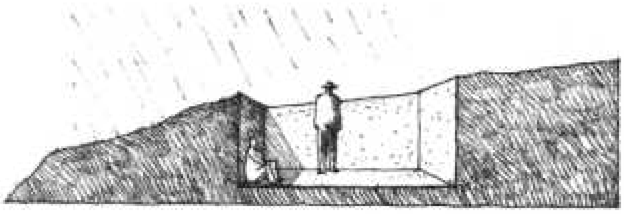
顶面上限定良好的“负”区域或空间，比如天窗，可以看作“正”形状，这些“正”形状形成了开洞下面的空间领域。

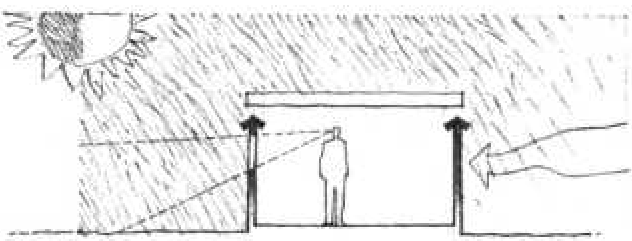


Interior of Church, Parish Center, Wolfsburg, Germany, 1960–1962, Alvar Aalto

教堂内部，教区中心，沃尔夫斯伯格，德国，1960年—1962年，A. 阿尔托







In the previous section of this chapter, horizontal planes defined fields of space in which the vertical boundaries were implied rather than explicitly described. The following section discusses the critical role vertical elements of form play in firmly establishing the visual limits of a spatial field.

本章前面的章节在讲述水平面限定空间区域时，提到了垂直边界但没有对此进行清晰地描述。以下章节将要讨论形式的垂直要素在严格地限定空间领域的视觉界限时所发挥的关键作用。

Vertical forms have a greater presence in our visual field than horizontal planes and are therefore more instrumental in defining a discrete volume of space and providing a sense of enclosure and privacy for those within it. In addition, they serve to separate one space from another and establish a common boundary between the interior and exterior environments.

在我们的视野中，垂直形体比水平面出现的更多，因此更有助于限定一个离散的空间容积，为其中的人们提供围合感与私密性。此外，垂直形体还用于把一个空间和另外一个空间分离开来，在室内和室外环境之间形成一道公共边界。

Vertical elements of form also play important roles in the construction of architectural forms and spaces. They serve as structural supports for floor and roof planes. They provide shelter and protection from the climatic elements and aid in controlling the flow of air, heat, and sound into and through the interior spaces of a building.

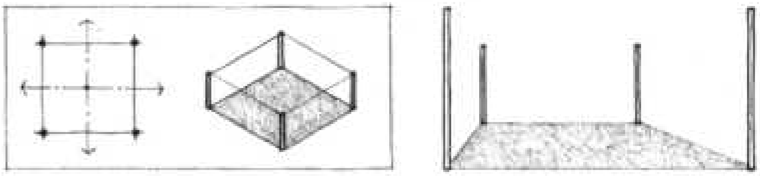
形体的垂直要素在构成建筑形式与空间方面也发挥着重要作用。它们是楼板与屋面的结构支撑。它们提供了遮风避雨的保护性场所，并有助于控制进入建筑物室内空间的气流、热量和噪声。

Vertical Linear Elements

Vertical linear elements define the perpendicular edges of a volume of space.

垂直线式要素

垂直的线式要素限定了一个空间容积的垂边。

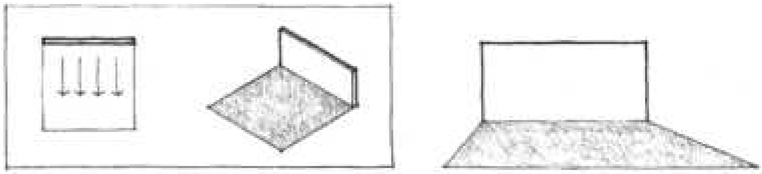


Single Vertical Plane

A single vertical plane articulates the space on which it fronts.

独立的垂直面

一个独立的垂直面清晰地表达着它所面对的空间。

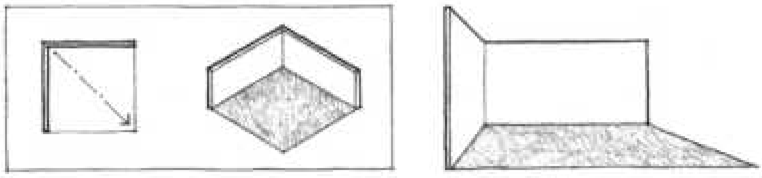


L-shaped Plane

An L-shaped configuration of vertical planes generates a field of space from its corner outward along a diagonal axis.

L形面

垂直面构成的L形构图可以产生一个空间区域，这个空间区域从L形的转角开始沿对角线向外扩展。

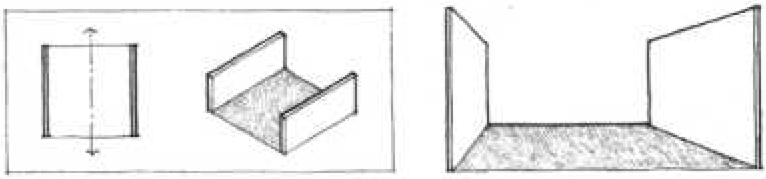


Parallel Planes

Two parallel vertical planes define a volume of space between them that is oriented axially toward both open ends of the configuration.

平行面

两个平行的垂直面限定了它们之间的空间容积，这个空间容积沿轴指向该图形的两个开敞端。

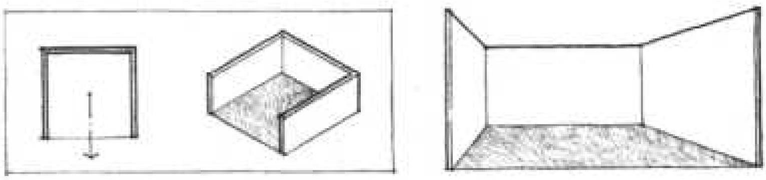


U-shaped Plane

A U-shaped configuration of vertical planes defines a volume of space that is oriented primarily toward the open end of the configuration.

U形平面

垂直面的U形构图限定了一个空间容积，这个空间容积完全指向该图形的开敞端。

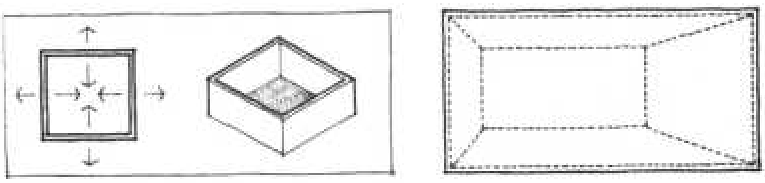


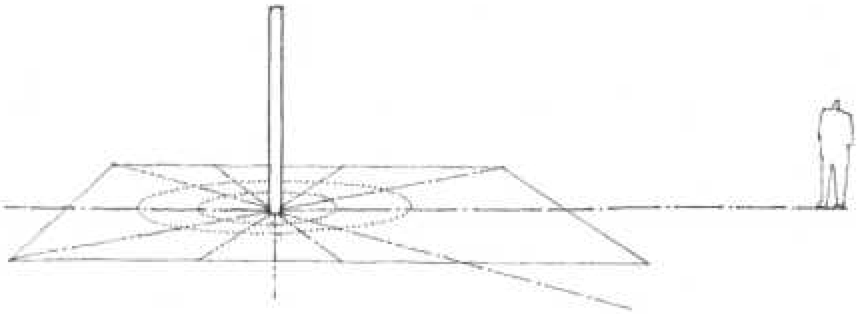
Four Planes: Closure

Four vertical planes establish the boundaries of an introverted space and influence the field of space around the enclosure.

四个面：闭合

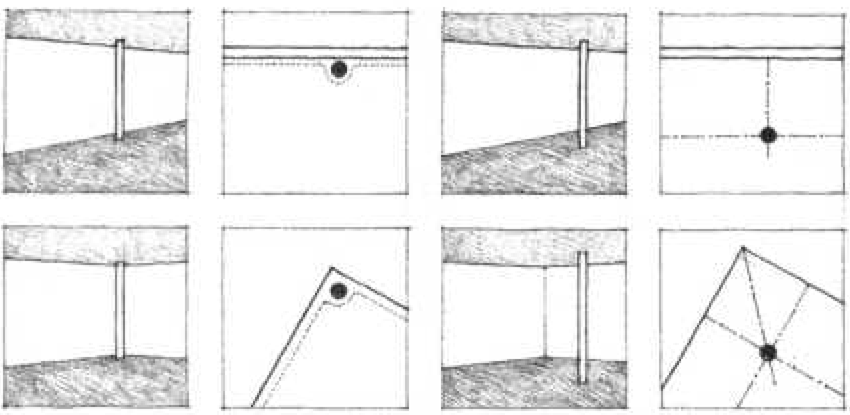
四个垂直面则形成了一个内向空间的边界，并影响到围墙周围的空间领域。





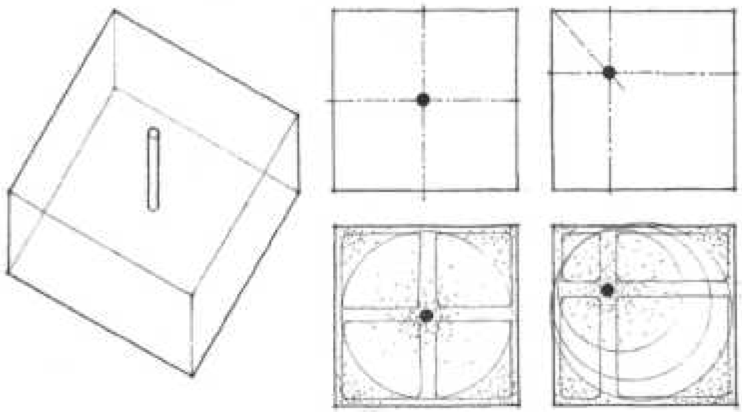
A vertical linear element, such as a column, obelisk, or tower, establishes a point on the ground plane and makes it visible in space. Standing upright and alone, a slender linear element is nondirectional except for the path that would lead us to its position in space. Any number of horizontal axes can be made to pass through it.

一个垂直的线要素，如一根柱子、一座方尖碑或一座塔，它们在地面上确立了一个点，而且在空间中令人注目。一个细长的线要素孤立地竖直向上，除了引领我们通向其空间位置的轨迹外，是没有方向性的。经过它可以做出任意数量的水平轴。



When located within a defined volume of space, a column will generate a spatial field about itself and interact with the spatial enclosure. A column attached to a wall buttresses the plane and articulates its surface. At the corner of a space, a column punctuates the meeting of two wall planes. Standing free within a space, a column defines zones of space within the enclosure.

当一根柱子定位于一个限定的空间容积中时，它会在自身周围产生一个空间领域，并与空间的围护物相互作用。附着在墙上的柱子能够加固墙面，并使其表面更加清晰。在一个空间的转角处，柱子能够强调两墙面的相交。柱子在空间中独立，则在围护结构之内限定出几个空间区域。

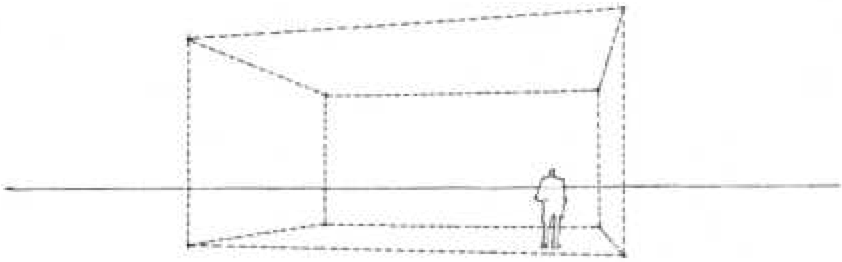


When centered in a space, a column will assert itself as the center of the field and define equivalent zones of space between itself and the surrounding wall planes. When offset, the column will define hierarchical zones of space differentiated by size, form, and location.

当柱子位于空间的中心时，柱子本身将确立为这一领域的中心，并且在柱身和周围墙面之间划定均等的空间区域。当柱子偏离中心位置的时候，就会根据尺寸、形式和部位而划定等级不同的空间区域。

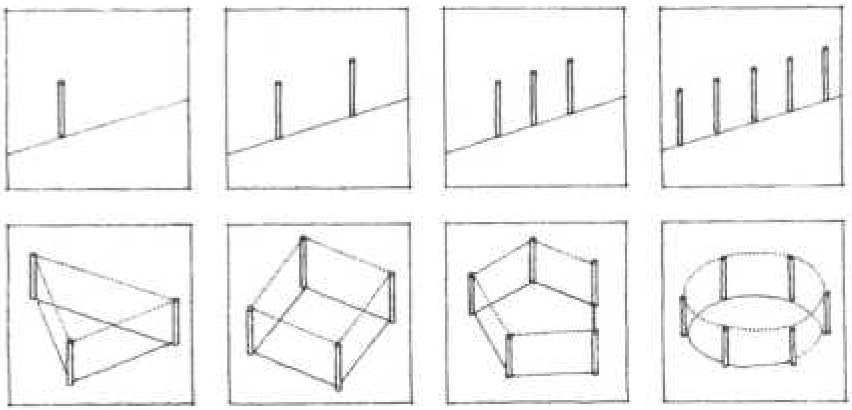
No volume of space can be established without the definition of its edges and corners. Linear elements serve this purpose in marking the limits of spaces that require visual and spatial continuity with their surroundings.

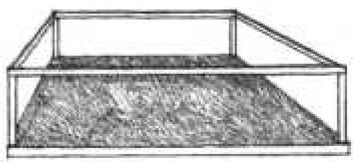
没有边和角的限定就没有空间的容积。线式要素刚好满足这一目的，限定出那些需要与周围环境保持视觉与空间连续性的空间的边界。



Two columns establish a transparent spatial membrane by the visual tension between their shafts. Three or more columns can be arranged to define the corners of a volume of space. This space does not require a larger spatial context for its definition, but relates freely to it.

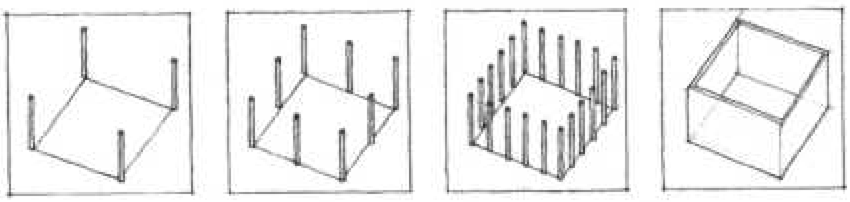
两根柱子之间的视觉张力，在两根柱子之间形成了一层透明的空间膜。三根或多根柱子可以用来限定空间容积的转角。这个空间的限定不需要更大范围的空间背景，而只是涉及柱子本身。

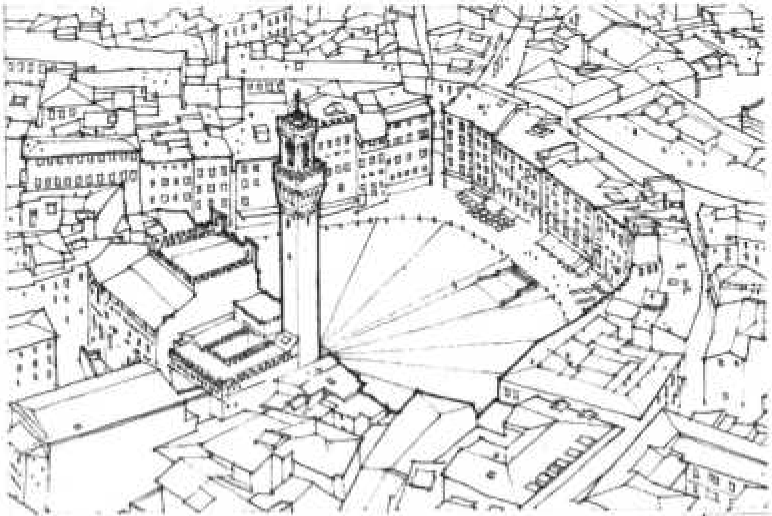




The edges of the volume of space can be visually reinforced by articulating its base plane and establishing its upper limits with beams spanning between the columns or with an overhead plane. A repetitive series of column elements along its perimeter would further strengthen the definition of the volume.

可以采用明确基面、在柱子之间搭上横梁或顶面，以形成其上部边界的方法，从视觉上加强空间容积的边缘。沿空间周边设置重复的柱要素系列将进一步加强容积的限定。

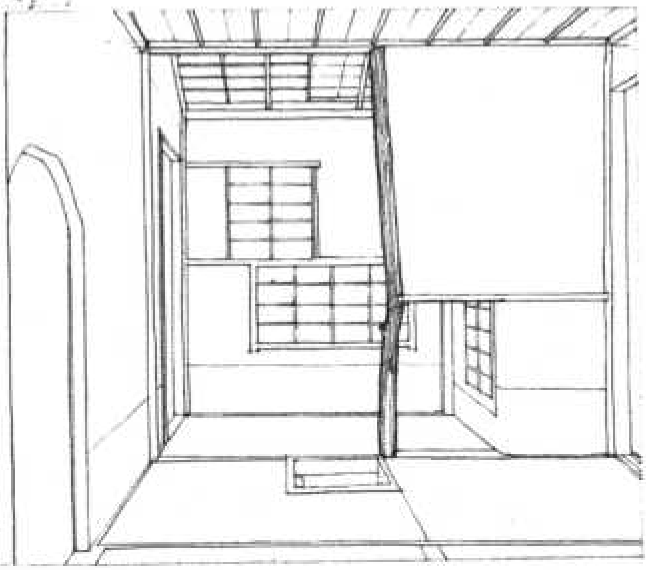




Piazza del Campo, Siena, Italy
坎波广场，西耶纳，意大利

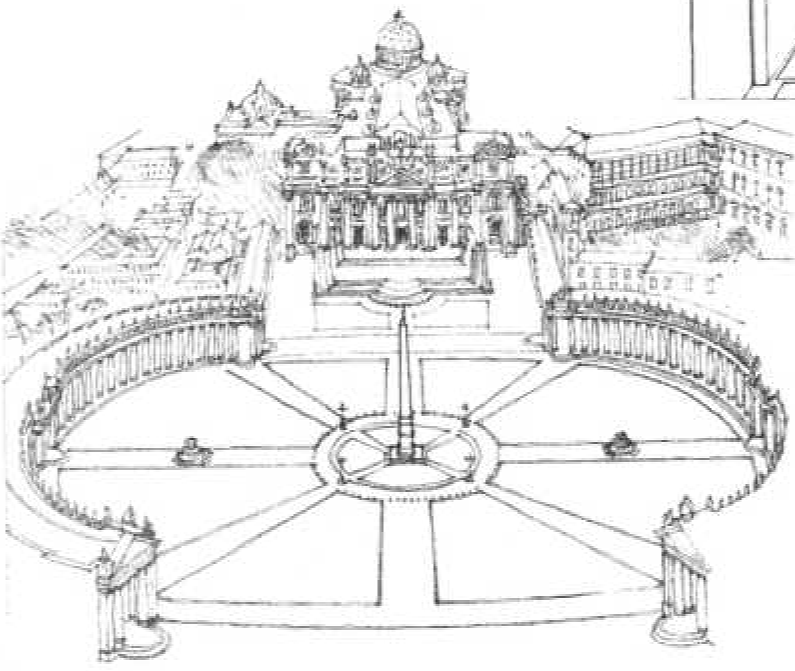
Vertical linear elements can terminate an axis, mark the center of an urban space, or provide a focus for an urban space along its edge.

垂直的线要素可以用来终止一根轴线，标出某一城市空间的中心，或者沿着其边缘为某一城市空间提供一个焦点。

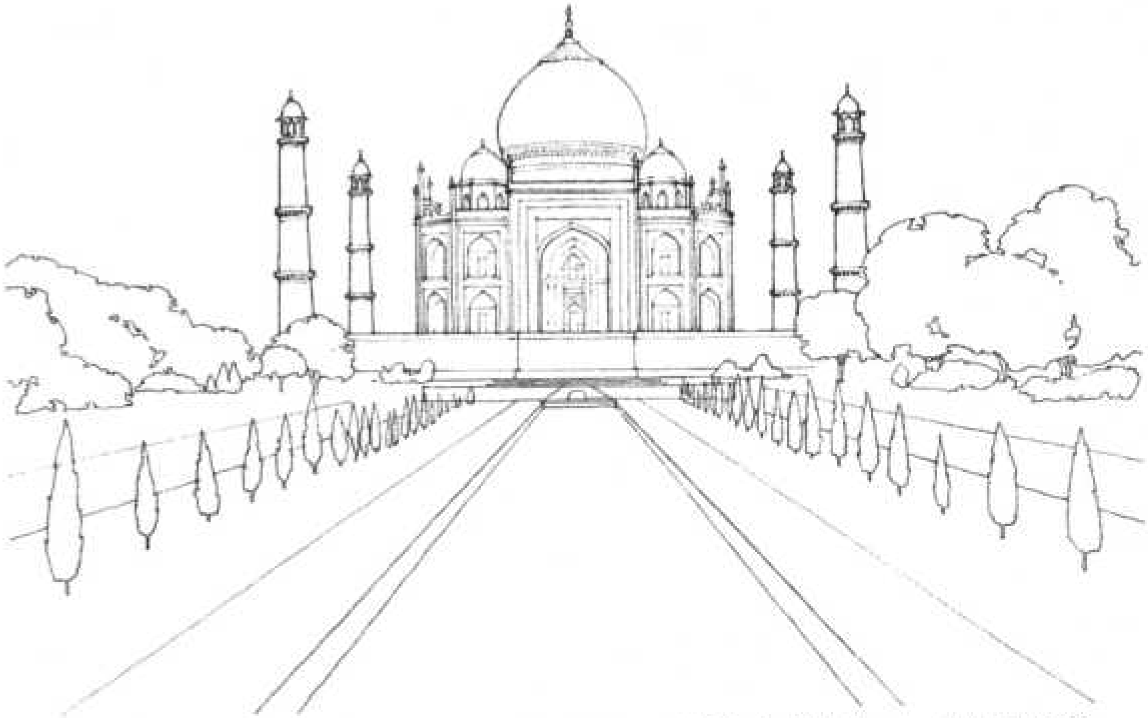


Shokin-Tei Pavilion, Katsura Palace, Kyoto, Japan, 17th century.
In the example above, the tokobashira, often a tree trunk in natural form, is a symbolic element that marks one edge of the tokonoma in a Japanese tearoom.

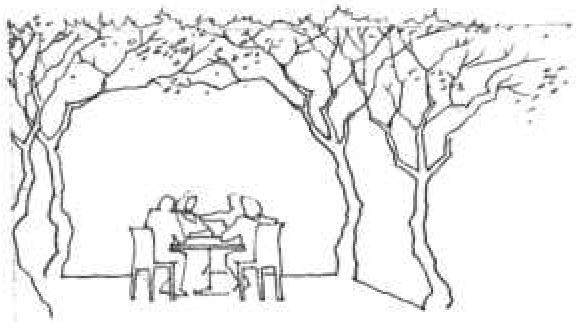
松琴亭，桂离宫，京都日本，17世纪
在上面的实例中，中柱通常是自然形态的树干，是一个象征性要素，标识出日本茶室中画室的一个边缘。



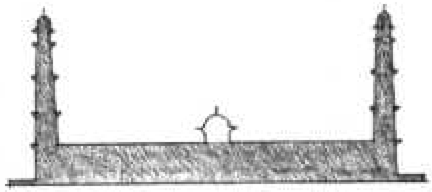
Piazza of St. Peter, Rome, 1655–1667, Giovanni Bernini
圣彼得广场，罗马，1655年—1667年，G. 伯尼尼



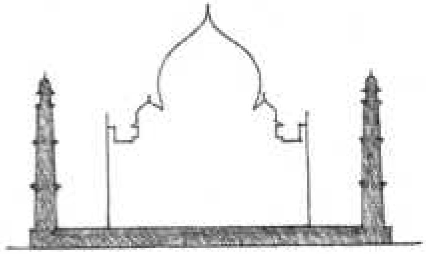
Taj Mahal, Tomb of Muntaz Mahal, wife of Shah Jahan, Agra, India, 1630–1653
泰姬·玛哈陵，M.玛哈是S.加汗的妻子，阿格拉，印度，1630年—1653年



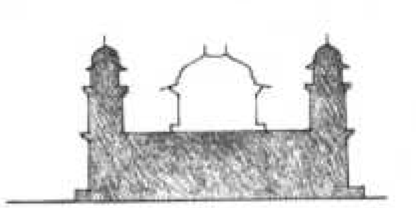
A bosket or grove of trees defining a shady place in a garden or park.
一片小树林或一丛树木，在苗圃或公园中限定出一个绿树成荫的场所。



Tomb of Jahangir, near Lahore
亚哈吉尔之陵墓，拉合尔附近



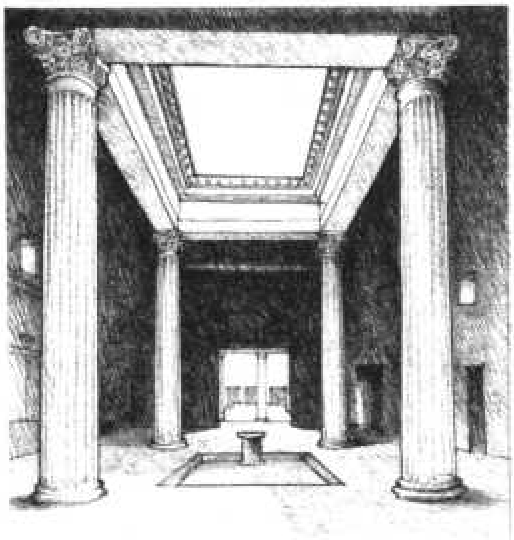
Tomb of Muntaz Mahal, Agra
泰姬·玛哈陵，阿格拉



Tomb of I'timad-ud-daula, Agra
伊提米德—乌德—道拉之陵墓，阿格拉

In these examples, various forms of minarets mark the corners of a platform and establish a field of space—a three-dimensional framework—for the Mogul mausoleum structures.
在这些实例中，各种形式的尖塔标识出平台的角部，为莫卧儿式的陵墓结构建立起一个空间区域——一个三度的框架。

From an analysis of Islamic Indian Architecture by Andras Volwahsen
引自A. 沃瓦森对印度伊斯兰建筑所做的分析。



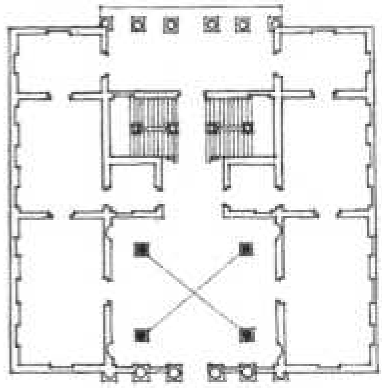
Tetrastyle Atrium, House of the Silver Wedding, Pompeii, 2nd century B.C.
四柱式中庭，银婚住宅，庞培，公元前2世纪

Four columns can establish the corners of a discrete volume of space within a larger room or setting. Supporting a canopy, the columns form an aedicule, a diminutive pavilion that serves as a shrine or the symbolic center of a space.

在一个较大的房间或环境中，四根柱子能够形成离散空间容积的四角。四根柱子支撑着顶棚，则形成一个小型建筑，它可以是作为神龛的小亭子或象征性的空间中心。

Traditional Roman houses typically were organized about an atrium open to the sky and surrounded by a roof structure supported at the corners by four columns. Vitruvius termed this a tetrastyle atrium.

典型的罗马传统住宅都是围绕着一个露天的中庭组织，周围是一圈有顶的结构，角部由四根柱子支撑。维特鲁威称之为“四柱式中庭”。



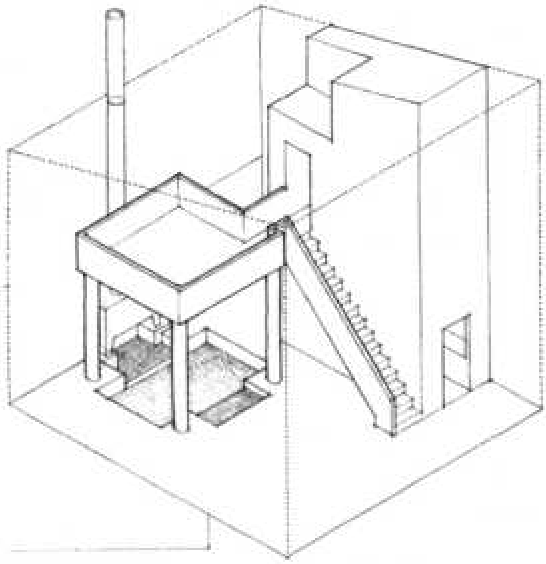
Palazzo Antonini, Udine, Italy, 1556, Andrea Palladio
安东尼尼宫，乌迪内，意大利，1556年，A. 帕拉第奥

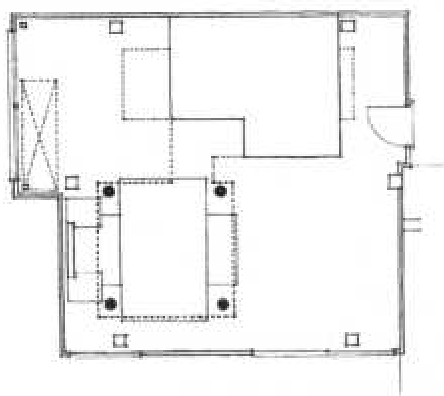
During the Renaissance, Andrea Palladio incorporated the tetrastyle theme in the vestibules and halls of a number of villas and palazzi. The four columns not only supported the vaulted ceiling and the floor above but also adjusted the dimensions of the rooms to Palladian proportions.

在文艺复兴时期，A. 帕拉第奥把四柱式主题用于许多别墅与豪宅的前厅和大厅。四根柱子不仅支撑着拱顶和上面的楼板，而且也调整了房间的尺度，成为帕拉第奥式的比例。

In the Sea Ranch condominium units, four posts along with a sunken floor and an overhead plane define an intimate aedicular space within a larger room.

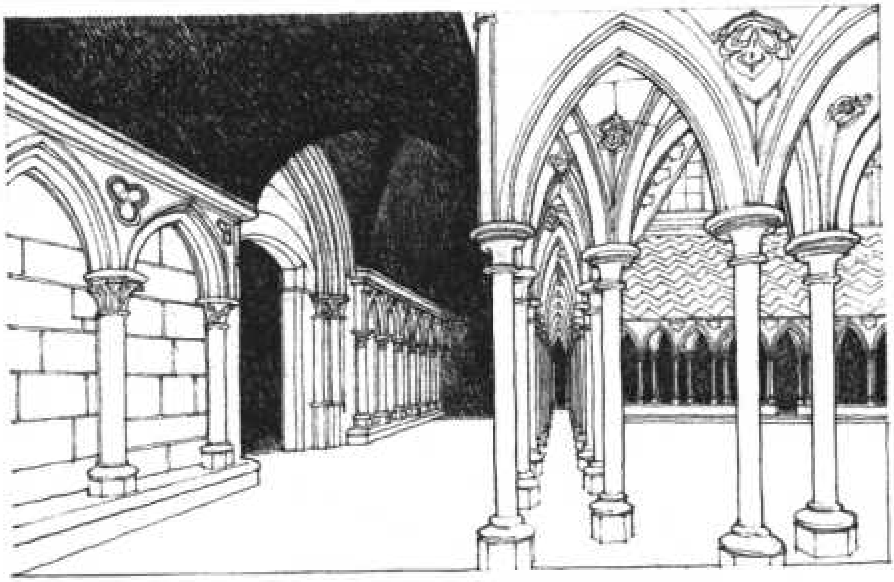
在瑞奇海滨的共有单元中，四根柱子连同一块下沉的楼板和顶板，在一个大房间里限定出一块亲切的小空间。

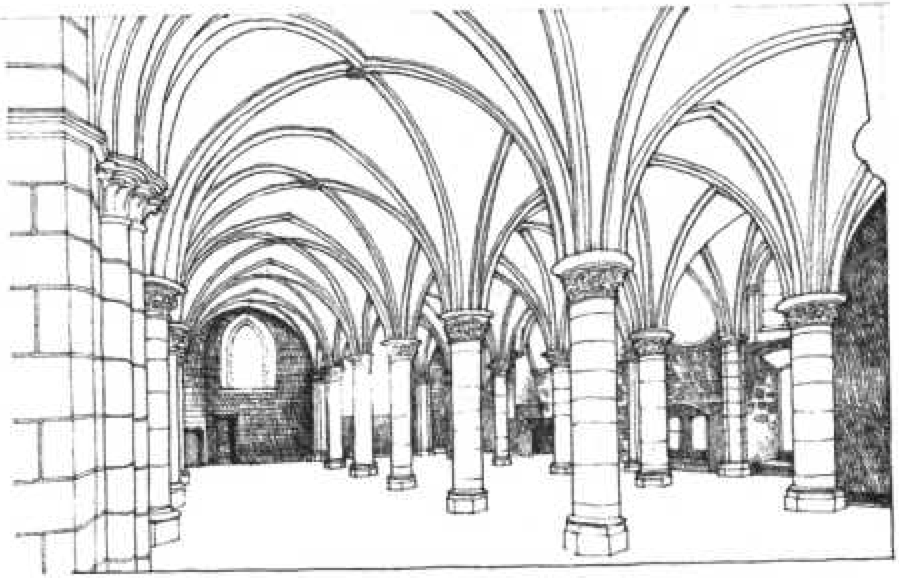


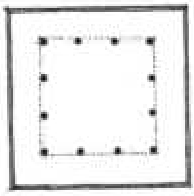


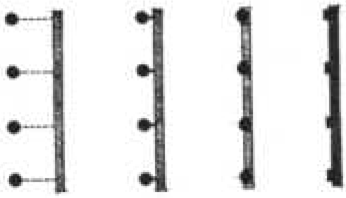
Condominium Unit No. 5, Sea Ranch, California, 1966, MLTW
共有单元第5号，瑞奇海滨，加利福尼亚州，1966年，MLTW

Cloister and Salle des Chevaliers,
Mont S. Michel, France, 1203–1228
回廊和舍瓦莱大厅，圣·米歇尔山，法国，1203年—1228年



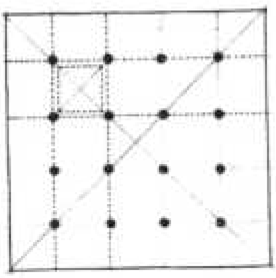






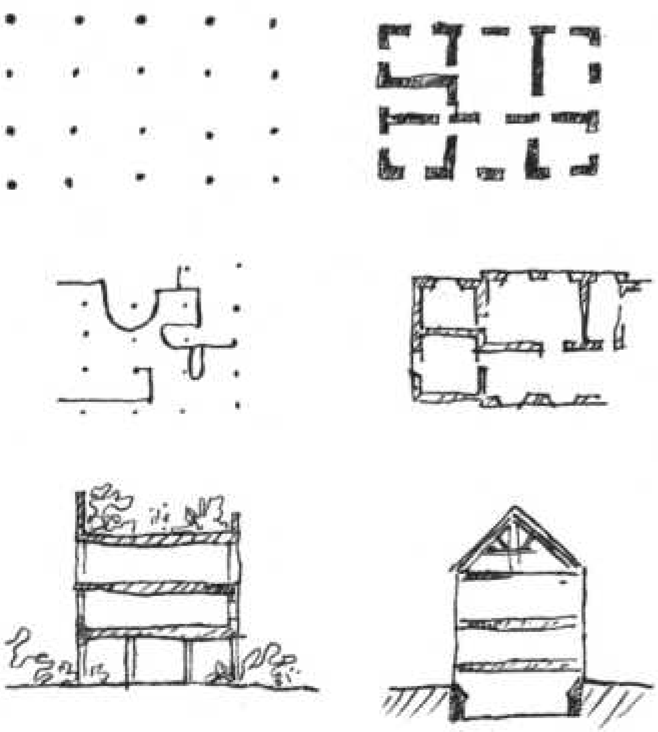
A regularly-spaced series of columns or similar vertical elements form a colonnade. This archetypal element in the vocabulary of architectural design effectively defines an edge of a spatial volume while permitting visual and spatial continuity to exist between the space and its surroundings. A row of columns can also engage a wall and become a pilastrade that supports the wall, articulates its surface, and tempers the scale, rhythm, and proportioning of its bays.

一系列间隔规整的柱子或类似的垂直要素就形成柱廊。在建筑设计语汇中，这种典型的要素有效地限定了空间容积的边界，同时在这类空间与其周围环境之间保留着视觉与空间的连续性。一排柱子也可以与墙结合成为支撑墙体的壁柱，明确地表达其表面，调节柱间隔的尺度、韵律和比例。

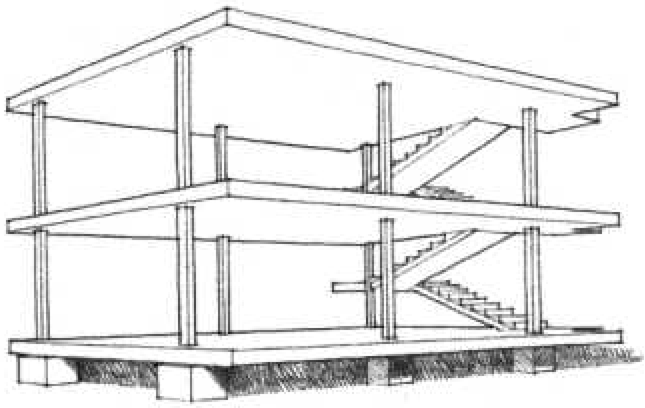


A grid of columns within a large room or hall not only serves to support the floor or roof plane above. The orderly rows of columns also punctuate the spatial volume, mark off modular zones within the spatial field, and establish a measurable rhythm and scale which make the spatial dimensions comprehensible.

在大房间或厅堂中的柱网，不单用来支撑楼面和上面的屋面。排列序有的一排排柱子也加强了空间的容积，在空间领域中划分出模数化的区域，同时生成了能够度量的韵律和尺度，从而使空间的量度易于理解。



Sketches for *The Five Points of the New Architecture*, 1926, Le Corbusier
为"新建筑五点"所作的草图，1926年，勒·柯布西埃



Dom-ino House Project, 1914, Le Corbusier
多米诺住宅体系，1914年，勒·柯布西埃

In 1926, Le Corbusier stated what he believed to be the "Five Points of the New Architecture." His observations were to a great extent the result of the development of reinforced concrete construction that began in the late nineteenth century. This type of construction, in particular the use of concrete columns to support floor and roof slabs, afforded new possibilities for the definition and enclosure of spaces within a building.

1926年，勒·柯布西埃阐明了他所确信的"新建筑五点"。他的论断在很大程度上是始于19世纪末钢筋混凝土技术发展的结果。这种建造技术，特别是利用混凝土柱子来支撑楼板和屋面板，为建筑中限定和围合空间提供了新的可能性。

Concrete slabs could cantilever beyond their column supports and enable the "free facade" of the building to be "light membranes" of "screen walls and windows." Within the building, a "free plan" was possible since the enclosure and layout of spaces were not determined or restricted by the pattern of heavy load-bearing walls. Interior spaces could be defined with non-load-bearing partitions, and their layout could respond freely to programmatic requirements.

混凝土板可以悬挑到支撑柱以外，并能使建筑物的"自由立面"成为"幕墙和窗户"构成的"轻型薄膜"。在建筑物中，"自由平面"成为可能，因为围护构件与空间格局不受厚重的承重墙形式的限制。内部空间可以用非承重的隔断来划分，这些隔断的布局可以自由地适应设计要求。

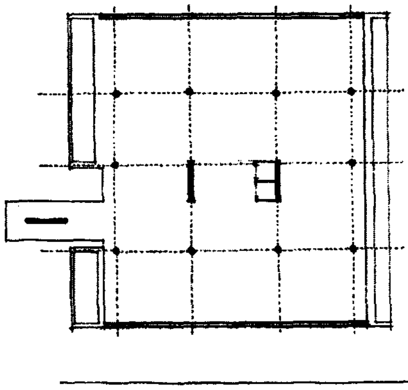
On the facing page, two contrasting examples of the use of a column grid are illustrated:

1. A column grid establishes a fixed, neutral field of space in which interior spaces are freely formed and distributed.
2. A grid of columns or posts corresponds closely to the layout of the interior spaces; there is a close fit between structure and space.

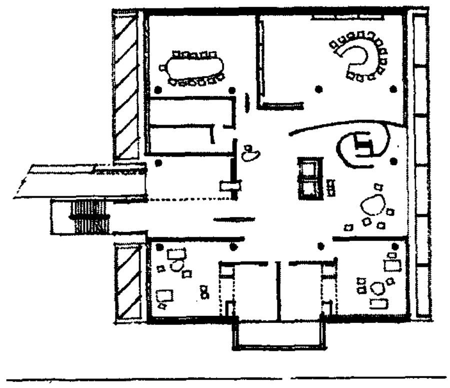
在下一页中，举出了两个对比的实例，它们利用柱网的方式是不同的：

1. 柱网生成了固定的、中性的空间区域，而柱网中的室内空间则自由形成与分配。
2. 柱子或支柱网格与室内空间的布局完全相符；结构与空间完全吻合。

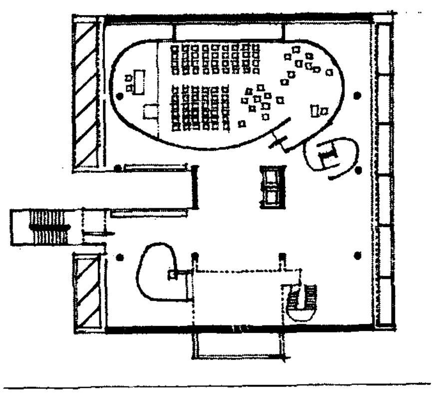
1. Millowners' Association Building, Ahmedabad, India, 1954, Le Corbusier
纺织实业家协会大厦，艾哈迈达巴德，印度，1954年，勒·柯布西埃



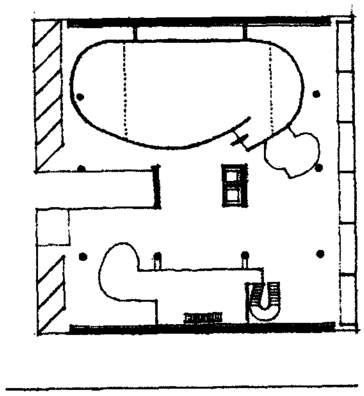
Column-grid pattern
柱网布置



1st floor plan
一层平面

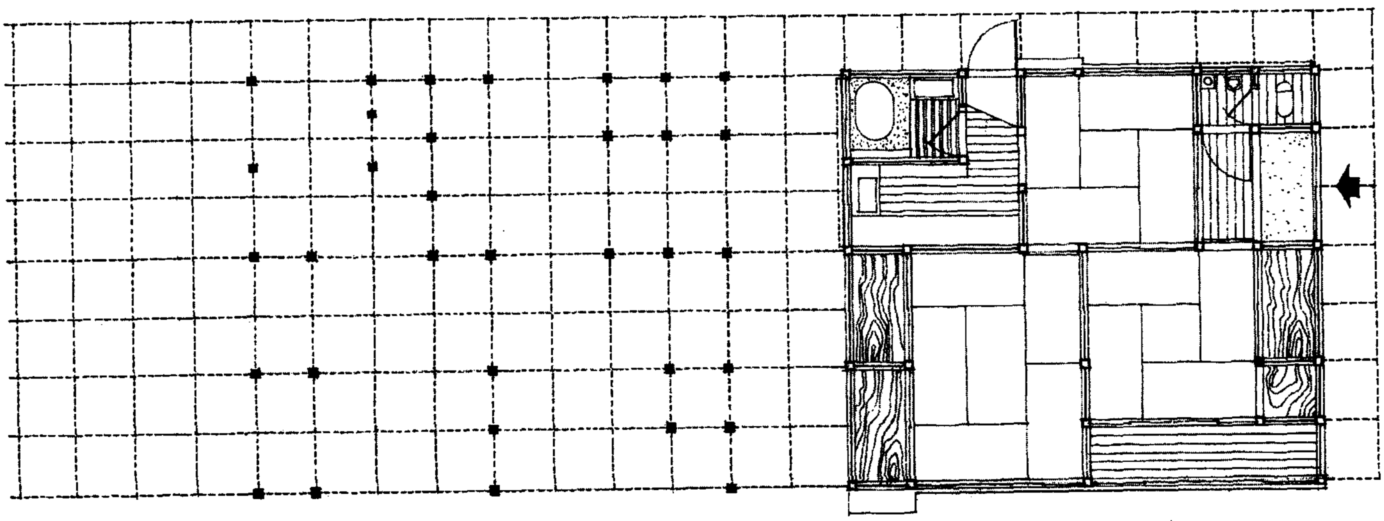


2nd floor plan
二层平面



3rd floor plan
三层平面

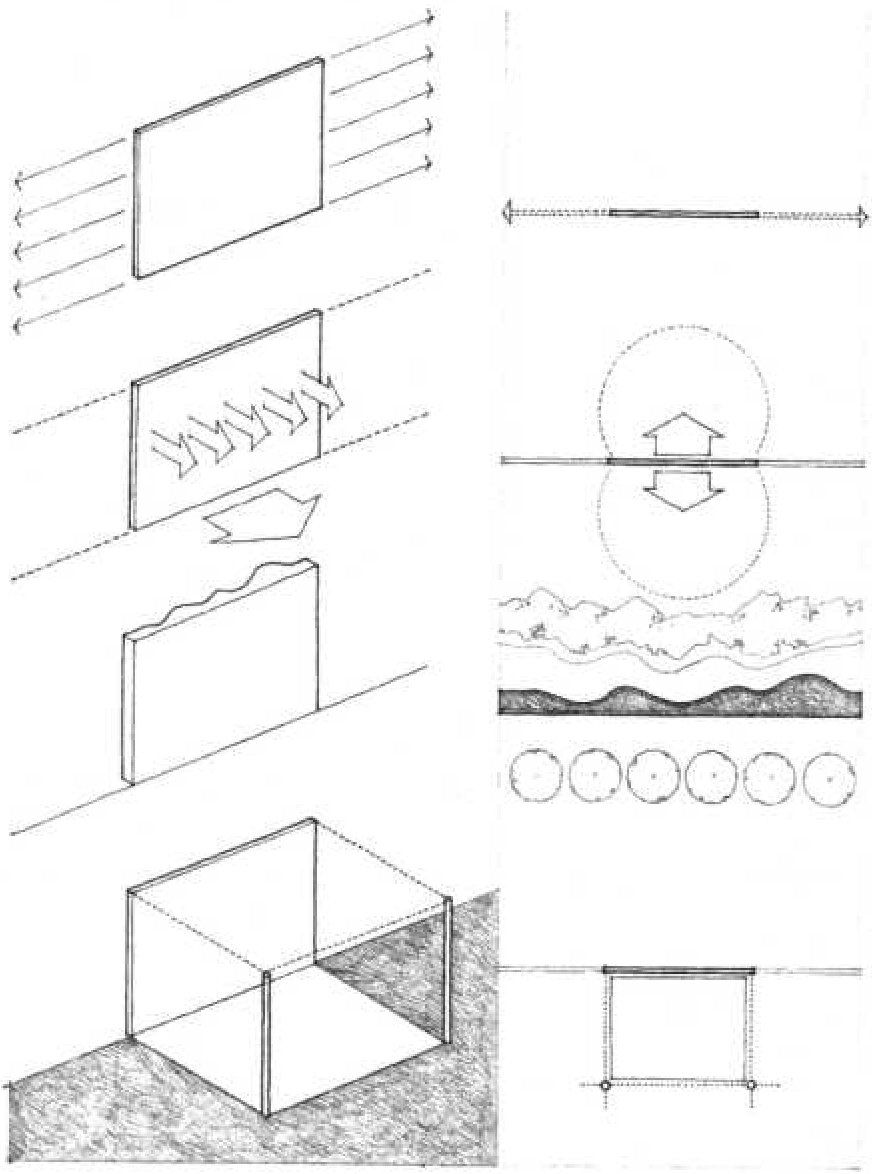
2. Traditional Japanese Residence
传统的日本住宅



Modular grid
模数化的网格

Post pattern
支柱图案

Floor plan
平面



A single vertical plane, standing alone in space, has visual qualities uniquely different from those of a freestanding column. A round column has no preferred direction except for its vertical axis. A square column has two equivalent sets of faces and therefore two identical axes. A rectangular column also has two axes, but they differ in their effect. As the rectangular column becomes more like a wall, it can appear to be merely a fragment of an infinitely larger or longer plane, slicing through and dividing a volume of space.

一个独立的垂直面，孤立地立在空间中，其视觉特征与独立柱截然不同。一根圆柱，除了其垂直轴外没有偏向。一根方柱，具有两套相当的立面，因此具有两个相同的轴。一根矩形的方柱也有两个轴，但两轴的效果是不同的。随着矩形柱子越来越像一面墙，人们可以把它当成是无限大或无限长的面的一部分，是穿过和分割空间容积的一个片。

A vertical plane has frontal qualities. Its two surfaces or faces front on and establish the edges of two separate and distinct spatial fields.

一个垂直面具有正面的特征。它的两个表面，也叫做“面”，面对两个彼此分离而又不同的空间领域，并形成两个空间领域的边缘。

These two faces of a plane can be equivalent and front similar spaces. Or they can be differentiated in form, color, or texture, in order to respond to or articulate different spatial conditions. A vertical plane can therefore have either two fronts or a front and a back.

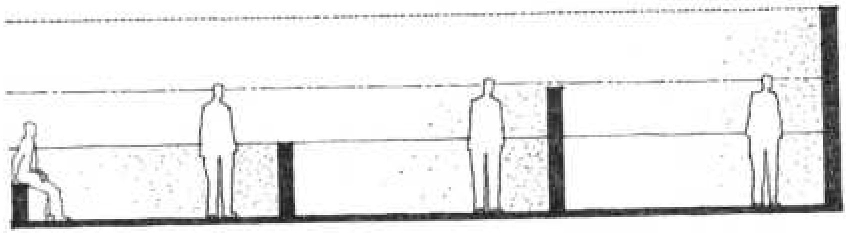
一个面的两个表面可以是完全一样的，并面临着相似的空间；也可以在形式、色彩或质感上有所不同，以呼应或表达不同的空间条件。因此，一个垂直面或者有两个正面，或者一个正面、一个背面。

The field of space on which a single vertical plane fronts is not well-defined. The plane by itself can establish only a single edge of the field. To define a three-dimensional volume of space, the plane must interact with other elements of form.

一个单独的垂直面所面对的空间领域并不能得到完好地限定。这个垂直面本身只能形成这一空间领域的一个边。为了限定一个三度的空间容积，一个垂直面必须与其他的形体要素相互作用。

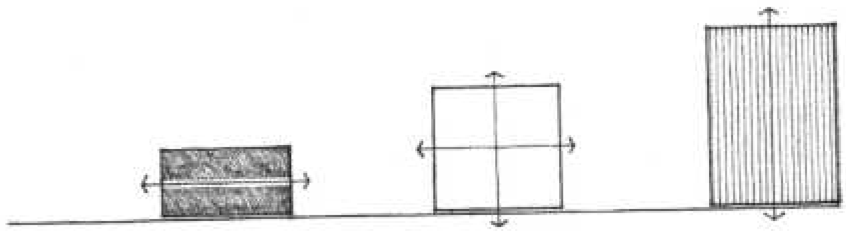
The height of a vertical plane relative to our body height and eye level is the critical factor that affects the ability of the plane to visually describe space. When two-feet high, a plane defines the edge of a spatial field but provides little or no sense of enclosure. When waist-high, it begins to provide a sense of enclosure while allowing for visual continuity with the adjoining space. When it approaches our eye level in height, it begins to separate one space from another. Above our height, a plane interrupts the visual and spatial continuity between two fields and provides a strong sense of enclosure.

一个与我们的身高和视平面相关的垂直面高度，是一个关键因素，它影响到垂直面在视觉上表现空间的能力。当两英尺高时，垂直面可以限定空间领域的边缘，但几乎不能提供围合感。当齐腰高的时候，垂直面就开始产生一种围合感，同时保持着与周围空间的视觉连续性。当接近我们的视线高度的时候，它就开始将一个空间与另一个空间分隔开来。当超过我们的身高时，它就打断了两个领域之间视觉与空间的连续性，并且提供了一种强烈的围护感。



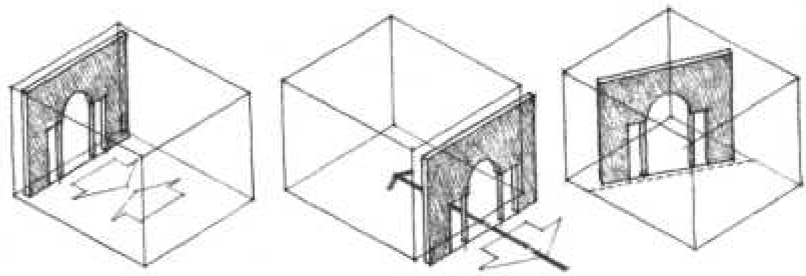
The surface color, texture, and pattern of a plane affect our perception of its visual weight, scale, and proportion.

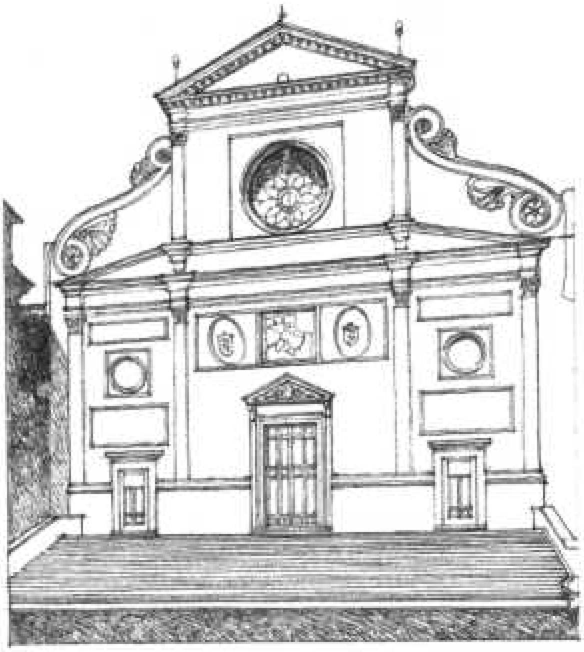
垂直面的表面色彩、质感和图案，影响到我们对其视觉重量、尺度和比例的感知。



When related to a defined volume of space, a vertical plane can be the primary face of the space and give it a specific orientation. It can front the space and define a plane of entry into it. It can be a freestanding element within a space and divide the volume into two separate but related areas.

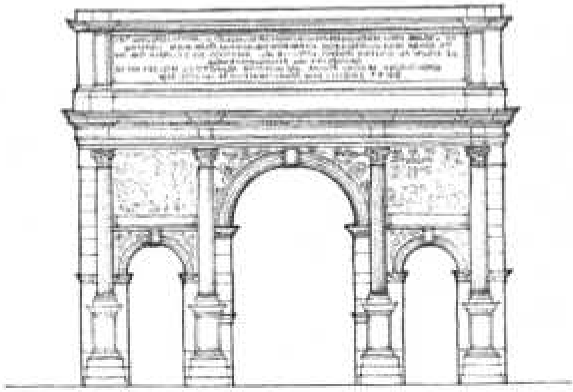
当涉及一个限定的空间容积时，一个垂直面可以作为该空间的基本面，并使空间具有特定的方向。它可以面对空间并限定一个进入该空间的面。它也可以是空间中的一个独立要素，把空间分成两个相分离而又有联系的地带。





S. Agostino, *Rome, 1479–1483, Giacomo da Pietrasanta*

圣阿戈斯蒂诺，罗马，1479年—1483年，G. 达彼得拉桑塔

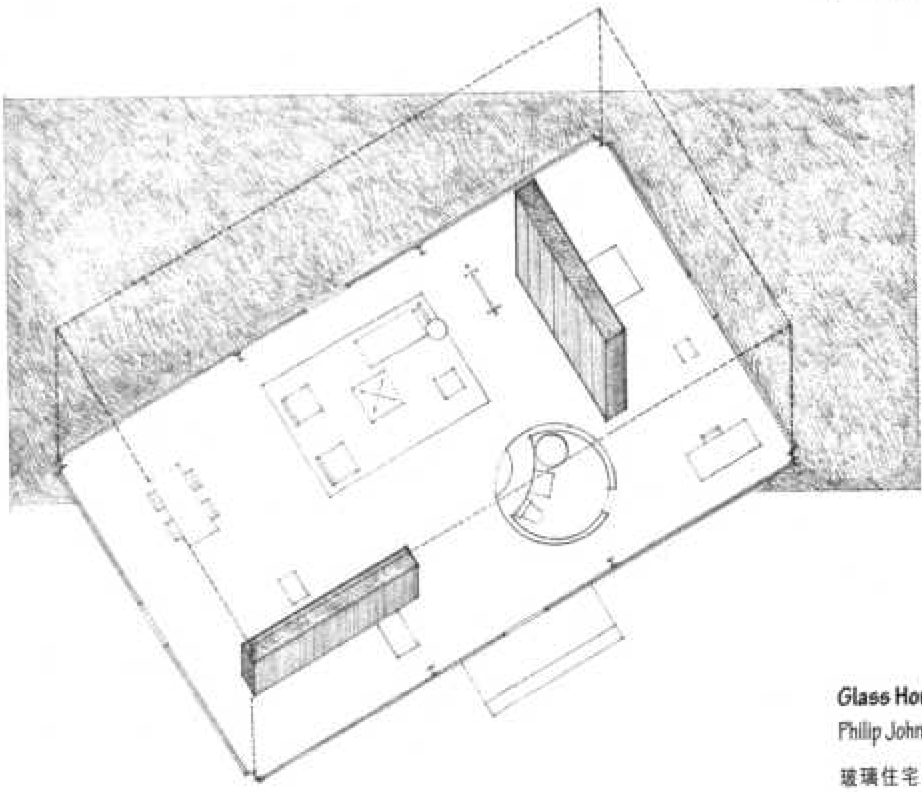


Arch of Septimius Severus, Rome, A.D. 203

S. 塞沃亚斯拱门，罗马，203年

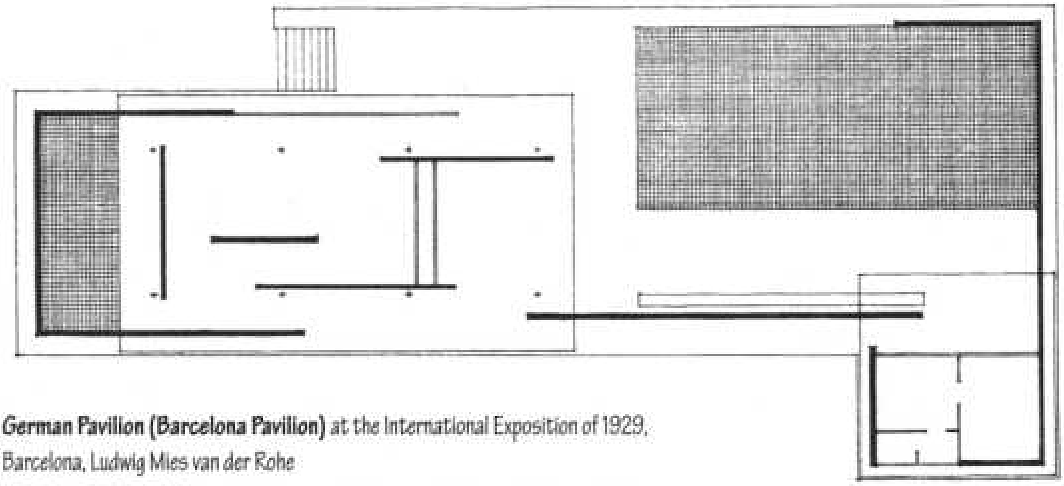
A single vertical plane can define the principal facade of a building fronting a public space, establish a gateway through which one passes, as well as articulate spatial zones within a larger volume.

一个独立的垂直面，能够限定一栋建筑物朝向公共空间的主立面，成为人们从中穿行的门道，同时也在一个更大的区域内，明确不同的空间领域。



Glass House, New Canaan, Connecticut, 1949, Philip Johnson

玻璃住宅，新坎南，康涅狄格州，1949年，P. 约翰逊

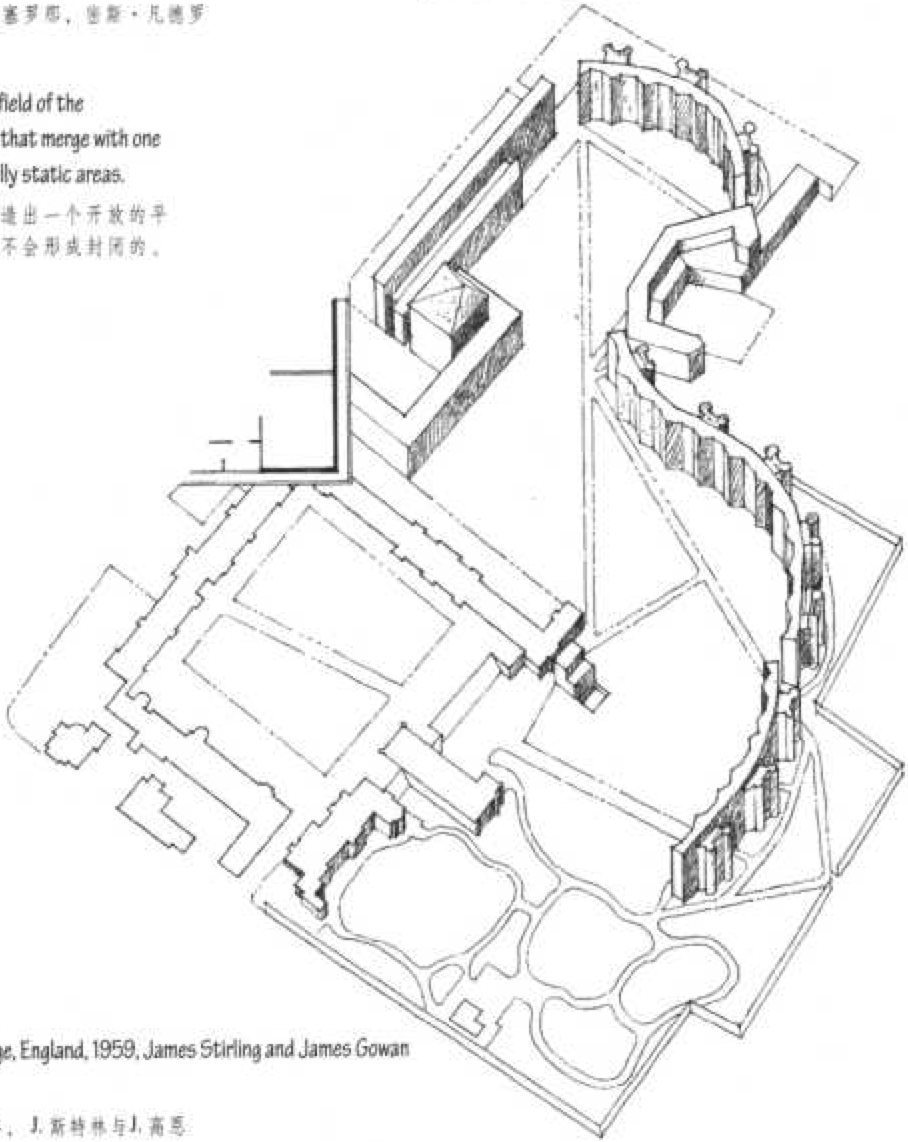


German Pavilion (Barcelona Pavilion) at the International Exposition of 1929, Barcelona, Ludwig Mies van der Rohe

德国馆（巴塞罗那馆），1929年国际博览会，巴塞罗那，密斯·凡德罗

A composition of vertical planes cuts the continuous field of the architectural volume, creating an open plan of spaces that merge with one another. The partitions never form closed, geometrically static areas.

垂直面的构图打断了建筑体量的连续区域，创造出一个开放的平面，在这个平面中空间彼此融合。这些隔断决不会形成封闭的、几何图形上静止的区域。

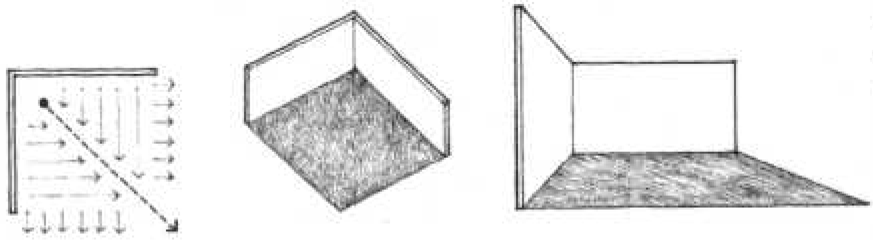


"A Garden-Wall Building"

Student Apartments, Selwyn College, Cambridge, England, 1959, James Stirling and James Gowan

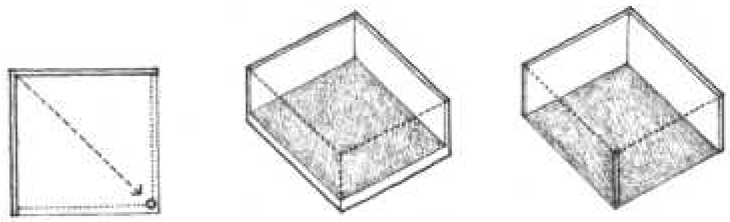
"花园墙建筑"

学生公寓，塞尔温学院，剑桥，英格兰，1959年，J.斯特林与J.高恩



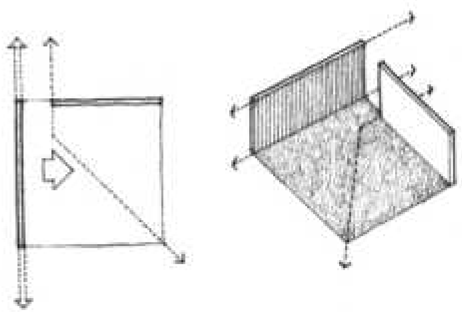
An L-shaped configuration of vertical planes defines a field of space along a diagonal from its corner outward. While this field is strongly defined and enclosed at the corner of the configuration, it dissipates rapidly as it moves away from the corner. The introverted field at the interior corner becomes extroverted along its outer edges.

L形的垂直面，从它的转角处沿对角线向外划定一个空间区域。在这一造型的转角处，该领域被强烈地限定和围起，而从转角处向外运动时，这个区域就迅速消散了。该领域在内角处呈内向性，而沿其外缘则变成外向的。



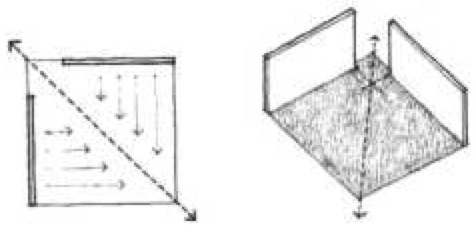
While two edges of the field are clearly defined by the two planes of the configuration, its other edges remain ambiguous unless further articulated by additional vertical elements, manipulations of the base plane, or an overhead plane.

该造型的两个面清楚地限定了这一领域的两个边缘，而其他的边界还是含糊的，除非用附加的垂直要素和对基面或顶面的处理来进一步明确。



If a void is introduced to one side of the corner of the configuration, the definition of the field will be weakened. The two planes will be isolated from each other and one will appear to slide by and visually dominate the other.

如果该造型转角的一侧引入空当，那么该领域的界限就会被削弱。两个面会彼此分离，其中一个面看上去好像要滑过另外一个面，并且在视觉上支配着另外一个面。

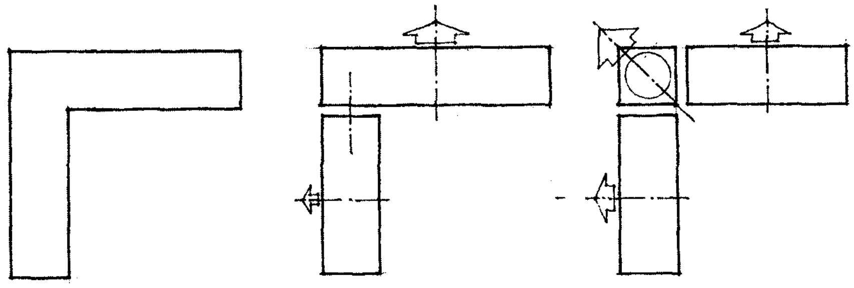


If neither plane extends to the corner, the field will become more dynamic and organize itself along the diagonal of the configuration.

如果两个面都不向转角处延伸，那么该领域会变得更加富于动感，并且本身沿着对角线方向来组合。

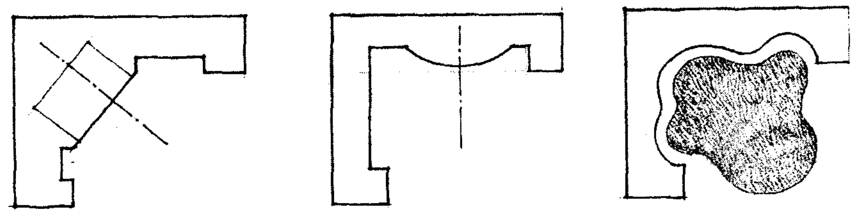
A building form can have an L-shaped configuration and be subject to the following readings. One of the arms of the configuration can be a linear form that incorporates the corner within its boundaries while the other arm is seen as an appendage to it. Or the corner can be articulated as an independent element that joins two linear forms together.

建筑形式可以具有L形造型，并可作如下解释：造型的一臂可以是线式形体，并把转角合并到它的边界中去，而另一臂则可以当成附属体。或者，把转角表达为一个独立的要素，把两个线式形体连在一起。



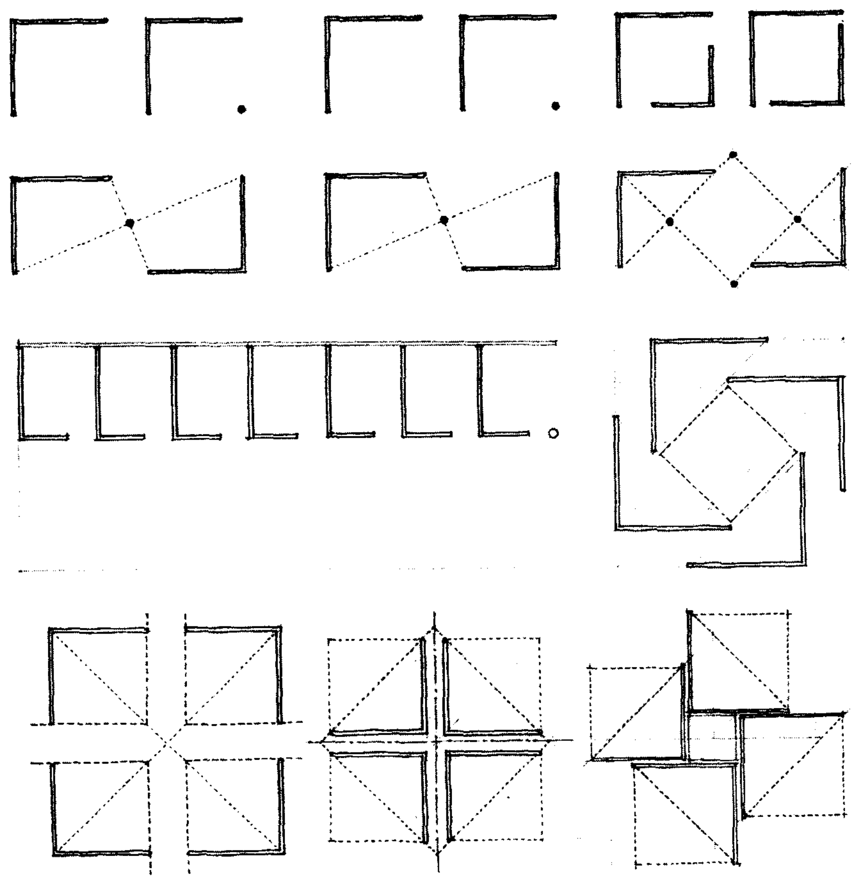
A building can have an L-shaped configuration to establish a corner of its site, enclose a field of outdoor space to which its interior spaces relate, or shelter a portion of outdoor space from undesirable conditions around it.

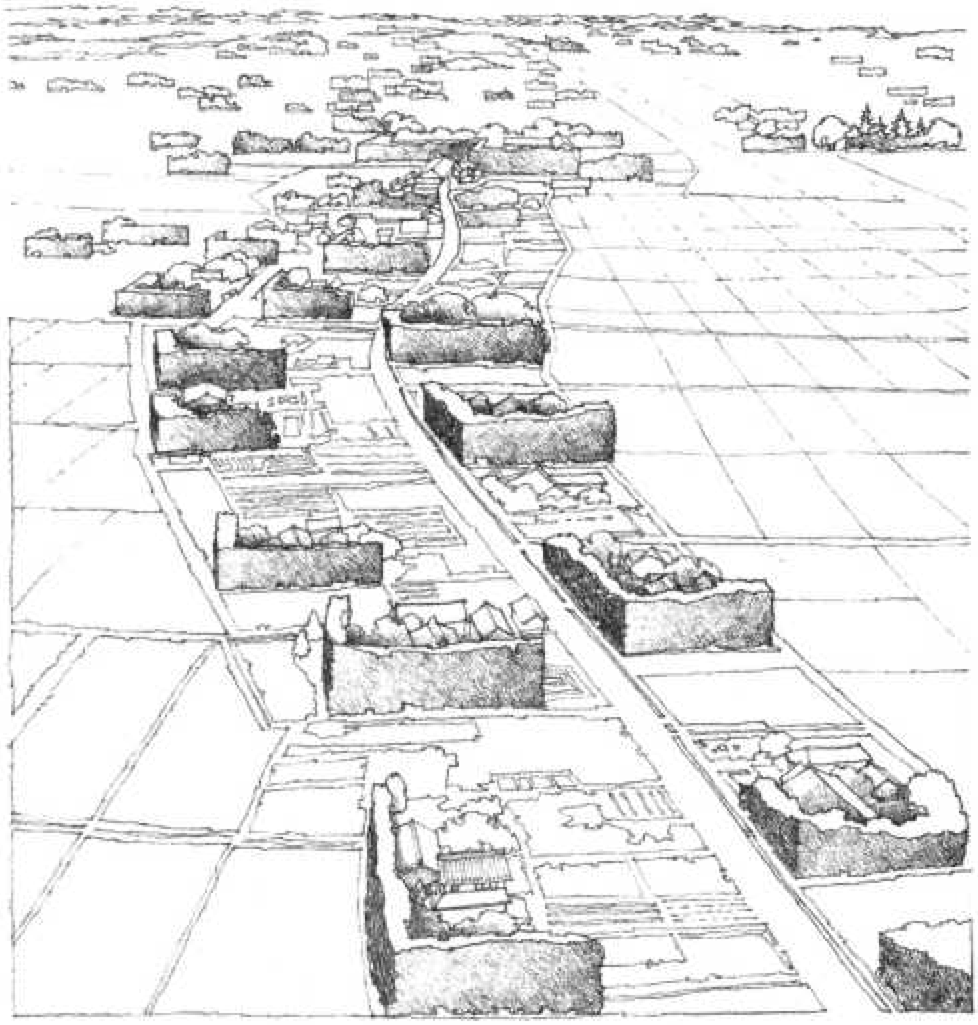
一座建筑物可以具有L形的造型，从而形成其基地的一个角，围起一片与室内空间相关的室外空间领域，或者挡住一部分室外空间，使其与周围不理想的条件隔离开。



L-shaped configurations of planes are stable and self-supporting and can stand alone in space. Because they are open-ended, they are flexible space-defining elements. They can be used in combination with one another or with other elements of form to define a rich variety of spaces.

平面的L形造型是稳定的、互相支撑的，可以独立于空间之中。因为端头是开敞的，所以它们是灵活的空间限定要素。它们可以彼此结合，或者与其他形式要素相结合，限定各种富于变化的空间。



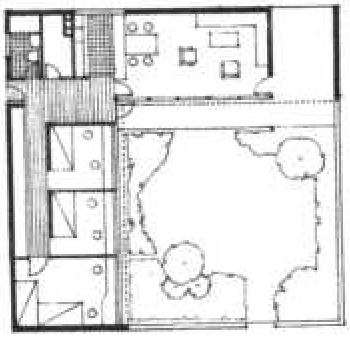


Vegetation Forming L-shaped Windscreens, Shimane Prefecture, Japan

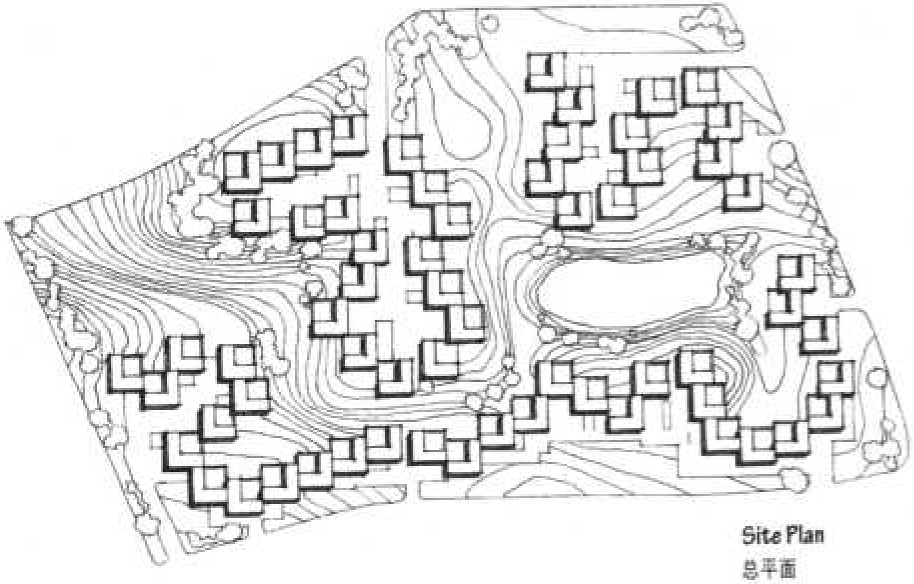
植被形成了 L 形的风屏，岛根县，日本

The sheltering aspect of an L-shaped configuration is expressed well in this example where Japanese farmers coaxed pine trees to grow into tall, thick, L-shaped hedges to shield their houses and land from winter winds and snowstorms.

这种呈L形的遮挡形式在这个实例中表现得很充分。在此例中，日本农民精心地把松树种成又高又密的L形绿篱，挡住房屋和土地，使其免受寒风和暴雪的袭击。



Basic Housing Unit
基本住宅单元



Site Plan
总平面

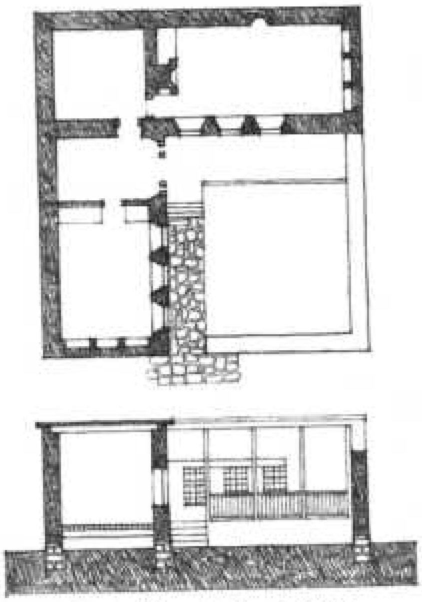
Kingo Housing Estate near Elsinore, Denmark
1958–1963, Jorn Utzon
埃尔西诺尔附近的**金戈居住区**，丹麦，
1958年—1963年，J. 伍重

A common theme found in examples of residential architecture is an L-shaped configuration of rooms enclosing an outdoor living space. Typically, one wing contains the communal living spaces while the other contains private, individual spaces. The service and utility spaces usually occupy a corner position or are strung along the backside of one of the wings.

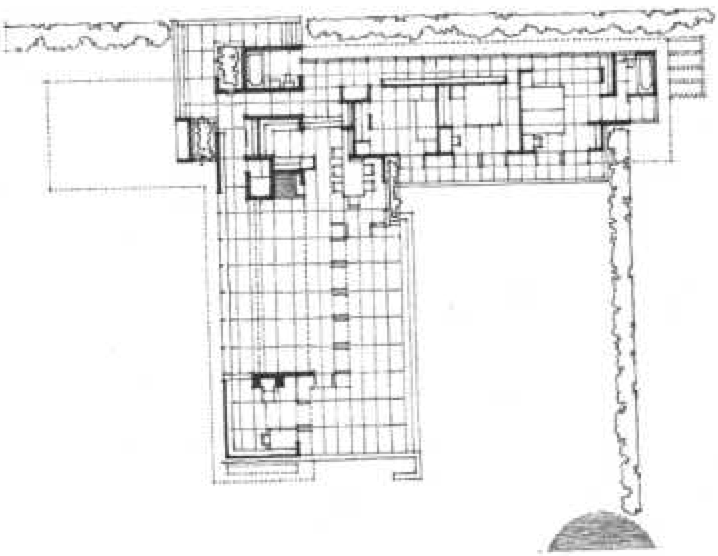
居住建筑实例中有一个常见的主题，那就是房间呈L形布置，围起一个室外的生活空间。典型的做法是，住宅的一翼容纳着公共的起居空间，而另一翼则容纳私密的、独立的空间。公用与服务性空间通常占据一角，或者沿一翼的背面排开。

The advantage of this type of layout is its provision of a private courtyard, sheltered by the building form and to which interior spaces can be directly related. In the Kingo Housing estate, a fairly high density is achieved with this type of unit, each with its own private outdoor space.

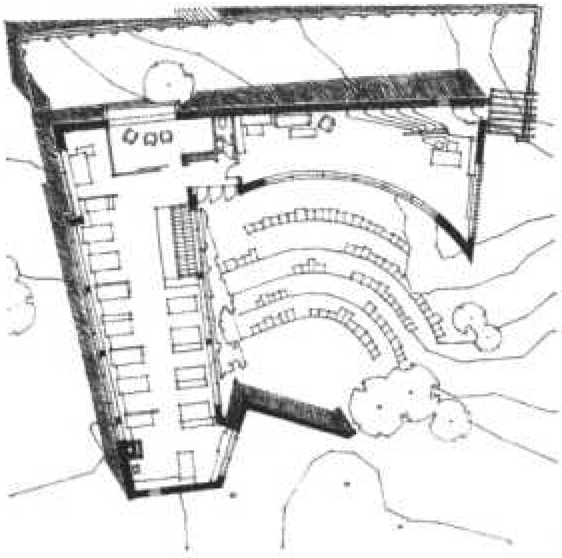
这种布局的好处在于它提供了一个私密的庭院，被建筑形体保护起来，并且建筑的室内空间可以与这个庭院直接发生关系。在金戈居住区中，采用这种单元获得了相当高的密度，并且每个单元都拥有自己的私家外部空间。



Traditional House in Konya, Turkey
科尼亚的传统住宅，土耳其



Rosenbaum House, Florence, Alabama, 1939, Frank Lloyd Wright
罗森包姆住宅，佛罗伦萨，亚拉巴马州，1939年，F. L. 莱特



Similar to the residential examples on the preceding page, these buildings use their L-shaped forms as sheltering or enclosing elements. The History Faculty Building at Cambridge uses a seven-story, L-shaped block to functionally and symbolically enclose a large, roof-lit library which is the most important space in the building.

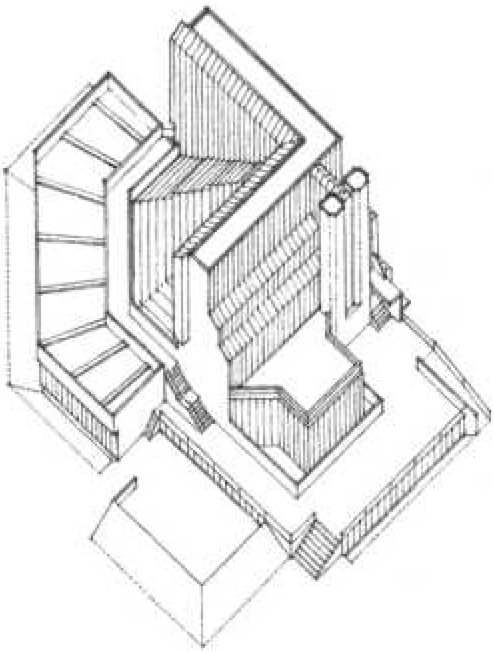
The outdoor space enclosed by the architect's studio in Helsinki is used as an amphitheater for lectures and social occasions. It is not a passive space whose form is determined by the building that encloses it. Rather, it asserts its positive form and pressures the form of its enclosure.

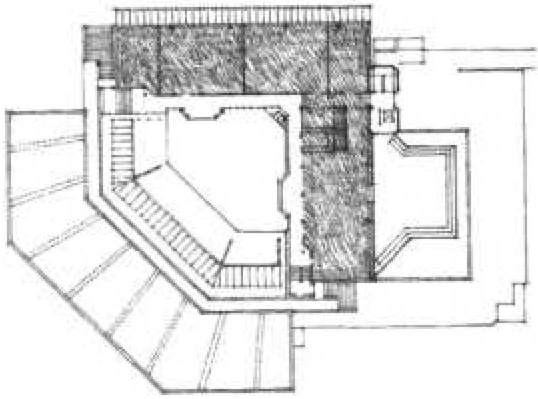
与前一页所举的居住建筑实例相似，这些建筑物也采用了L形的形式作为遮挡或围护要素。剑桥的历史系大楼采用七层、L形体量，依照功能要求和象征意义，围合起一个大型的、屋顶采光的图书馆，这里是建筑物最重要的空间。

在赫尔辛基，建筑师的工作室所围合的外部空间，被用作讲演或社会活动的露天场地。它不是一个被动的空间，其形式决定于围合空间的建筑物。不仅如此，它还表明了其形式是积极的，并使围合这个空间的形式具有了说服力。

Architect's Studio, Helsinki, 1955–1956, Alvar Aalto

建筑师工作室，赫尔辛基，1955年—1956年， A. 阿尔托

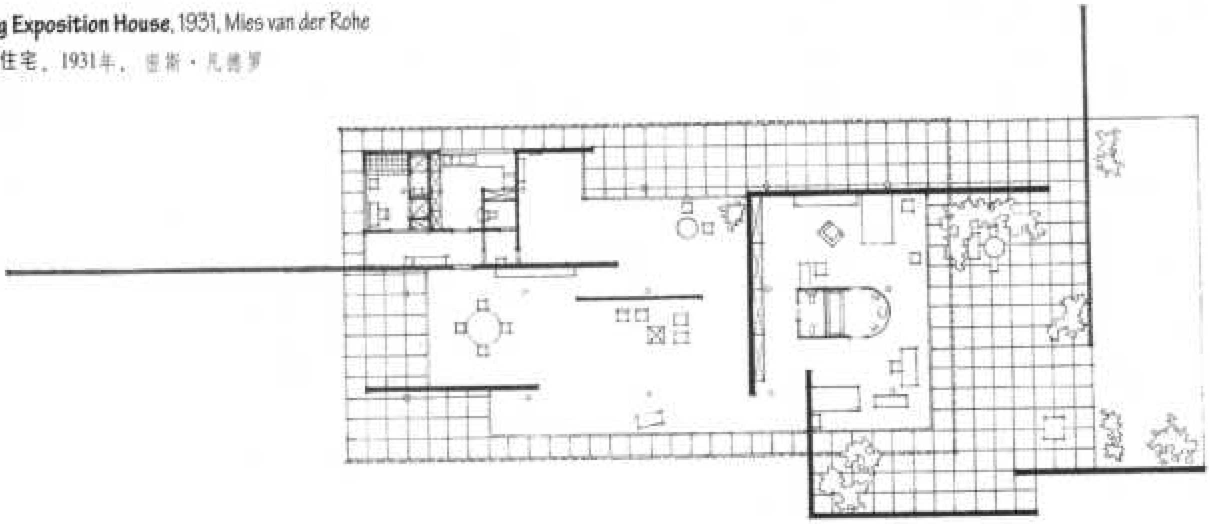




History Faculty Building, Cambridge University, England, 1964–1967, James Stirling

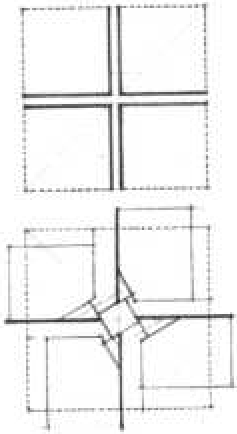
历史系大楼，剑桥大学，英格兰，1964年—1967年，J. 斯特林

Berlin Building Exposition House, 1931, Mies van der Rohe
柏林建筑展览住宅，1931年，密斯·凡德罗

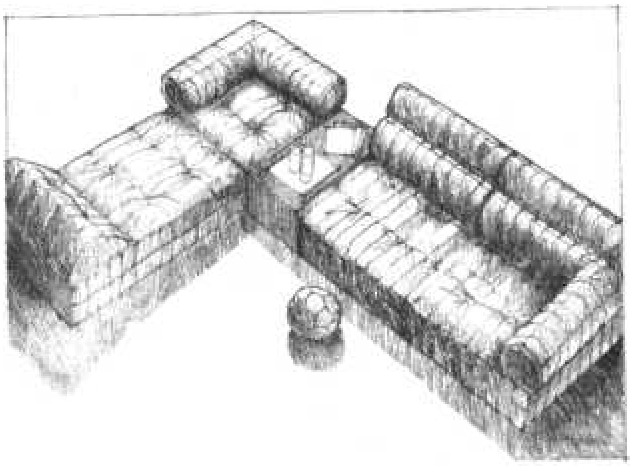




Suntop Homes, Four-family Housing Units, Ardmore, Pennsylvania, 1939, Frank Lloyd Wright
桑托普住宅，四户居住单元，阿德莫尔，宾夕法尼亚州，1939年，F. L. 莱特

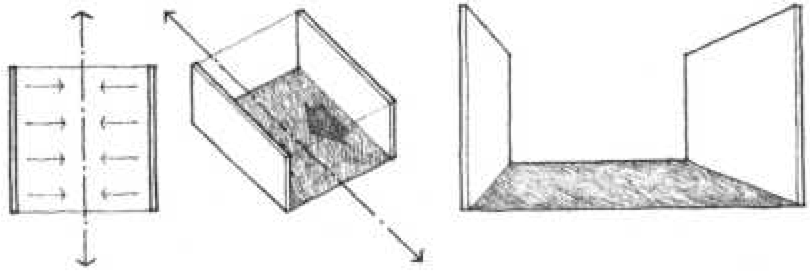


Diagram, St. Mark's Tower, New York City, 1929, Frank Lloyd Wright
图解，圣马可的塔楼，纽约市，1929年，F. L. 莱特



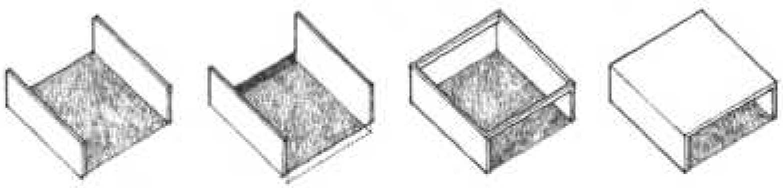
In these examples, L-shaped walls separate the units of a quadruplex housing organization and define zones within a building as well as spaces within a room.

在这些实例中，L形的墙面把这些单元分成四户住宅的组合，并且既在一栋建筑里划分出不同的区域，也在一个房间里划分出不同的空间。



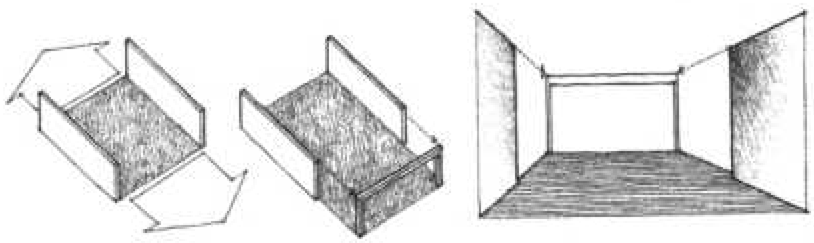
A pair of parallel vertical planes defines a field of space between them. The open ends of the field, established by the vertical edges of the planes, give the space a strong directional quality. Its primary orientation is along the axis about which the planes are symmetrical. Since the parallel planes do not meet to form corners and fully enclose the field, the space is extroverted in nature.

一对平行的垂直面，在它们之间限定出一个空间领域。该领域敞开的两端，是由面的垂直边缘形成的，赋予空间一种强烈的方向感。它的基本方向是沿着这两个面的对称轴的。由于平行面不相交，不能形成交角，也不能完全包围这一领域，所以这个空间是外向性的。



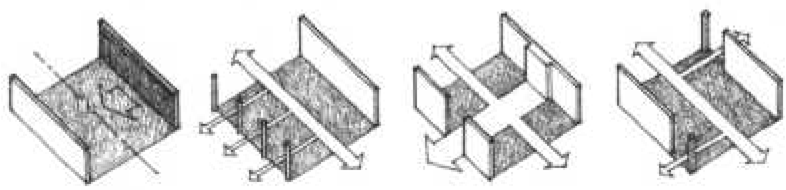
The definition of the spatial field along the open ends of the configuration can be visually reinforced by manipulating the base plane or adding overhead elements to the composition.

沿图形开放端的空间范围的限定，可以通过处理基面或为图形增加顶面要素的方法，使其从视觉上得到加强。



The spatial field can be expanded by extending the base plane beyond the open ends of the configuration. This expanded field can, in turn, be terminated by a vertical plane whose width and height is equal to that of the field.

将基面延伸到图形的开放端以外，可以扩大空间领域。反过来，这一延伸的区域可以被一个垂直面终止，只要这个垂直面的高度和宽度与该空间的高度和宽度相等。



If one of the parallel planes is differentiated from the other by a change in form, color, or texture, a secondary axis, perpendicular to the flow of the space, will be established within the field. Openings in one or both of the planes can also introduce secondary axes to the field and modulate the directional quality of the space.

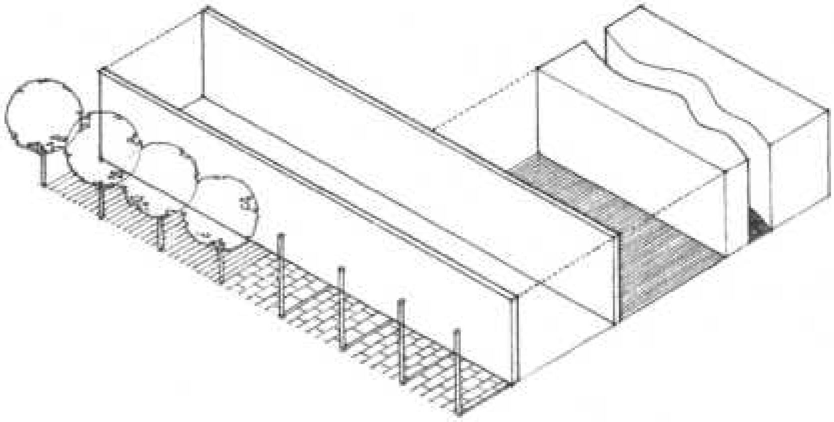
如果一个平行面在形式、色彩或质感上有所变化，不同于另外一个垂直面，那么这一领域内将产生一个垂直于空间流的次要轴线。在一个面或两个平行面上的开洞，也会为该区域引进次要轴线，并调整空间的方向性。

Various elements in architecture can be seen as parallel planes that define a field of space:

- a pair of parallel interior walls within a building
- a street space formed by the facades of two facing buildings
- a colonnaded arbor or pergola
- a promenade or allée bordered by rows of trees or hedges
- a natural topographical form in the landscape

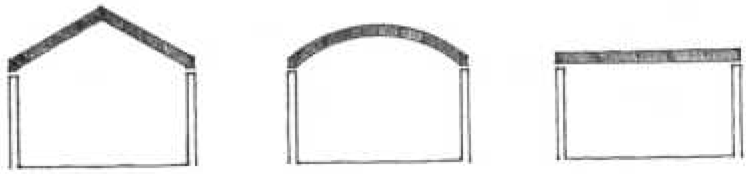
建筑中的各种要素，均可视为限定空间领域的平行面：

- 建筑物内一对平行的内墙
- 两座相对的建筑物立面形成的街道空间
- 带有列柱的凉亭或藤架
- 路边是两排树木或绿篱的步道或小径
- 地景中的自然地形



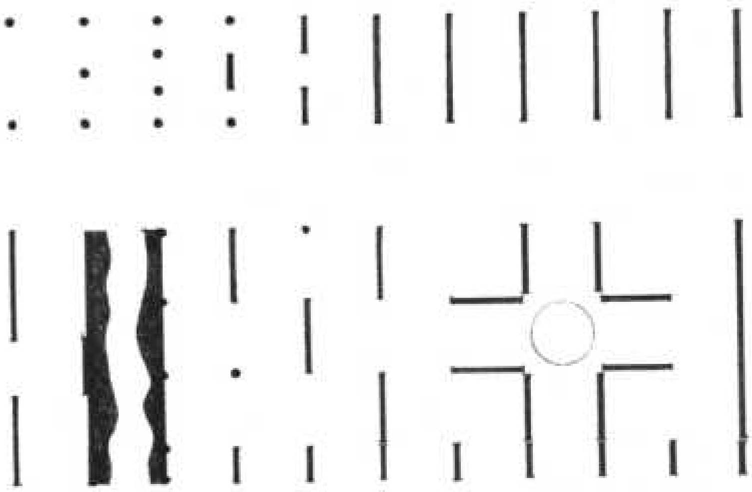
The image of parallel vertical planes is often associated with the bearing-wall structural system, wherein a floor or roof structure spans the spaces between two or more parallel load-bearing walls.

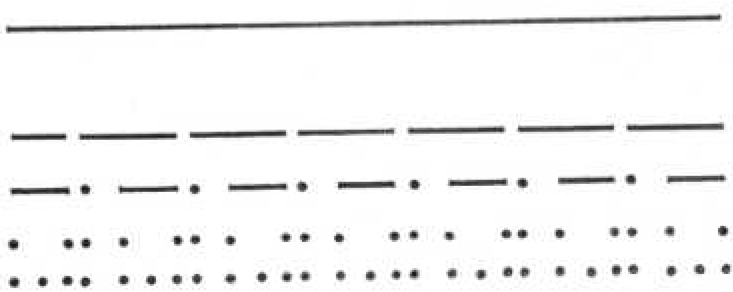
平行垂直面的形象，常常是与承重墙的结构体系相结合的，其中楼板或屋顶结构跨越两个或更多的平行承重墙形成的空间。

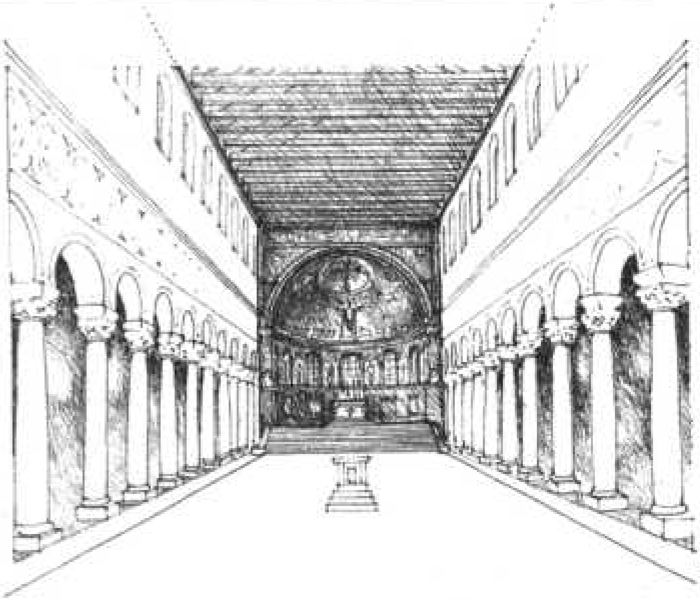


Sets of parallel vertical planes can be transformed into a wide variety of configurations. Their spatial fields can be related to one another either through the open ends of their configurations or through openings in the planes themselves.

成组的平行面，可以变成多种多样的造型。通过造型的开放端，或通过平面本身的孔洞，空间领域之间可以互相发生关系。







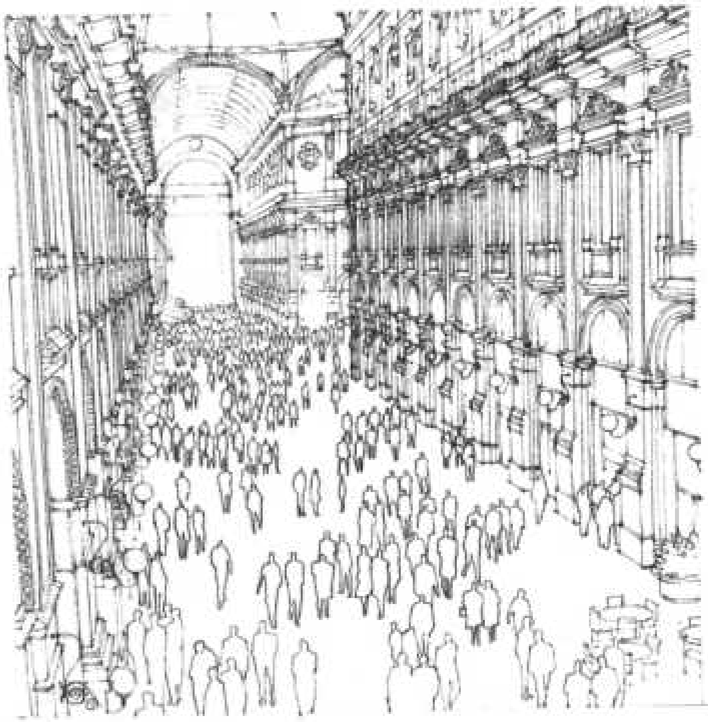
Nave of the basilican church, **S. Apollinare in Classe**, Ravenna, Italy, 534–539

巴西利卡式教堂的中殿，克拉斯的S.阿波利奈尔，拉文纳，意大利，534年—539年



Champ de Mars, Paris

3月大街，巴黎



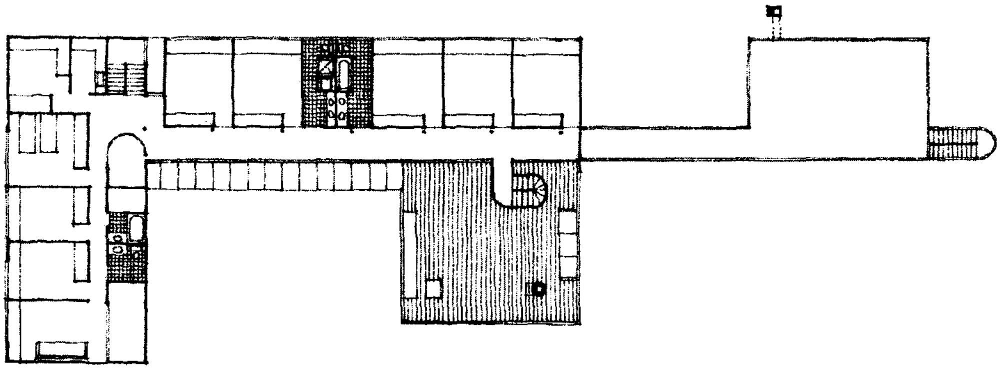
The directional quality and flow of the space defined by parallel planes are naturally manifested in spaces used for circulation and movement, such as the streets and boulevards of towns and cities. These linear spaces can be defined by the facades of the buildings fronting them, as well as by the more permeable planes established by colonnades, arcades, or rows of trees.

由平面所限定的方向性和空间流，自然地表现在用于运动与流线的空间中，如城镇的大街小巷。这些线式空间可以由朝向它的建筑立面来限定，也可以由比较通透的面，如柱廊、拱廊或成排的树来限定。

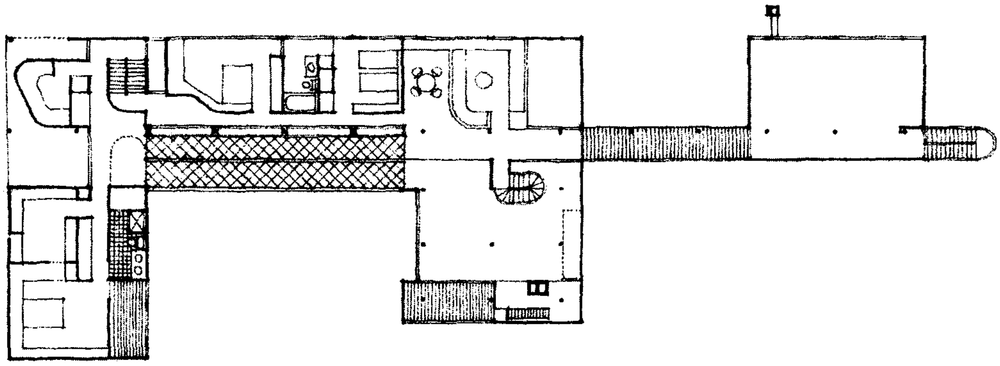
Galleria Vittorio Emanuelle, Milan, Italy, 1865–1877, G. Mengoni

V. 伊曼纽尔连廊，米兰，意大利，1865年—1877年，G. 蒙高尼

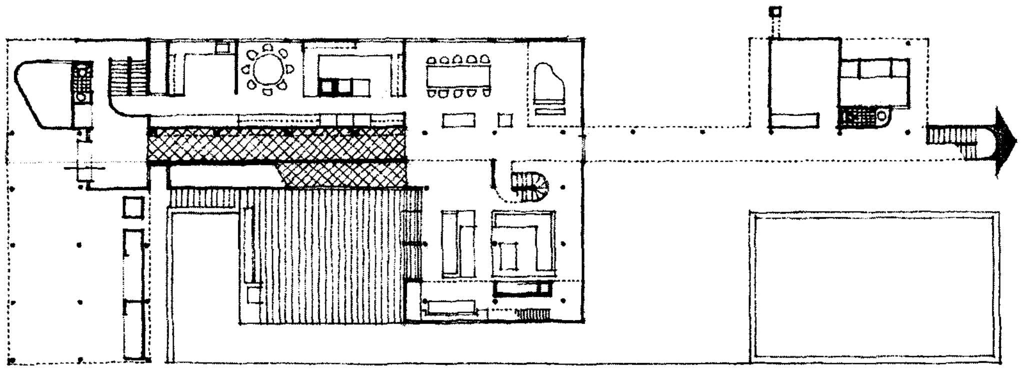
House in Old Westbury, New York, 1969–1971, Richard Meier
在奥德韦斯特伯里的住宅，纽约，1969年—1971年， R. 迈耶



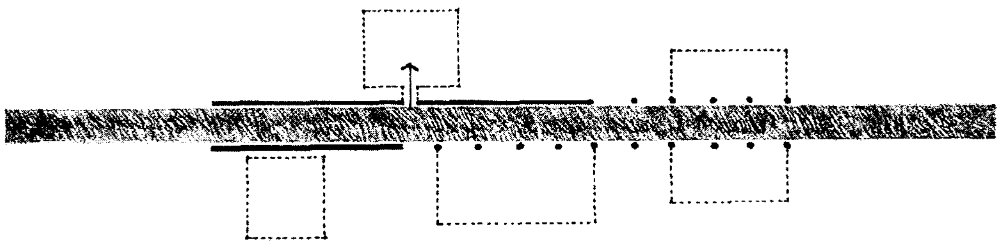
Upper level
上层平面



Middle level
中层平面



Ground level
首层

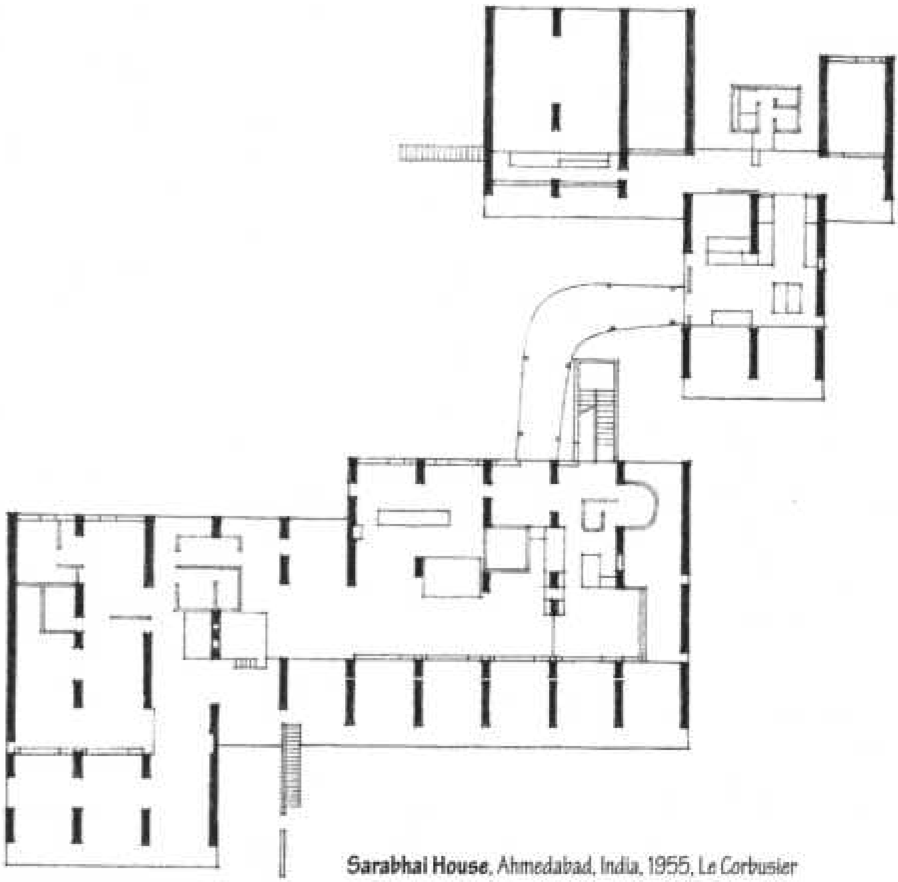


The flow of the space defined by parallel planes corresponds naturally to the paths of movement within a building, along its corridors, halls, and galleries.

The parallel planes that define a circulation space can be solid and opaque to provide privacy for the spaces along the circulation path. The planes can also be established by a row of columns so that the circulation path, open on one or both of its sides, becomes part of the spaces it passes through.

由平行面所限定的空间流，沿着走道、厅堂和长廊自然地与建筑物中的行动轨迹相吻合。

限定交通空间的平行面，可以是实的、不透明的，为交通轨迹沿线的空间提供私密性。这种面也可以由一排柱子形成，那么，一端或两端都有开口的流线轨迹，就变成它所穿越的空间的一部分。



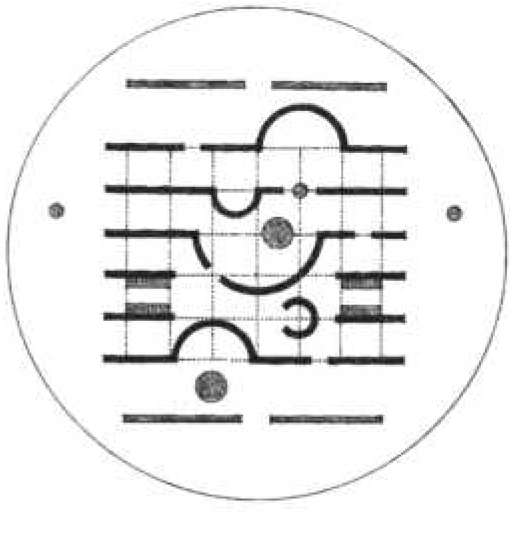
Sarabhai House, *Ahmedabad, India, 1955, Le Corbusier*
萨拉布亥住宅，艾哈迈达巴德，印度，1955年，勒·柯布西埃

The parallel vertical planes of a bearing-wall structural system can be the generating force behind the form and organization of a building. Their repetitive pattern can be modified by varying their length or by introducing voids within the planes to accommodate the dimensional requirements of larger spaces. These voids can also define circulation paths and establish visual relationships perpendicular to the wall planes.

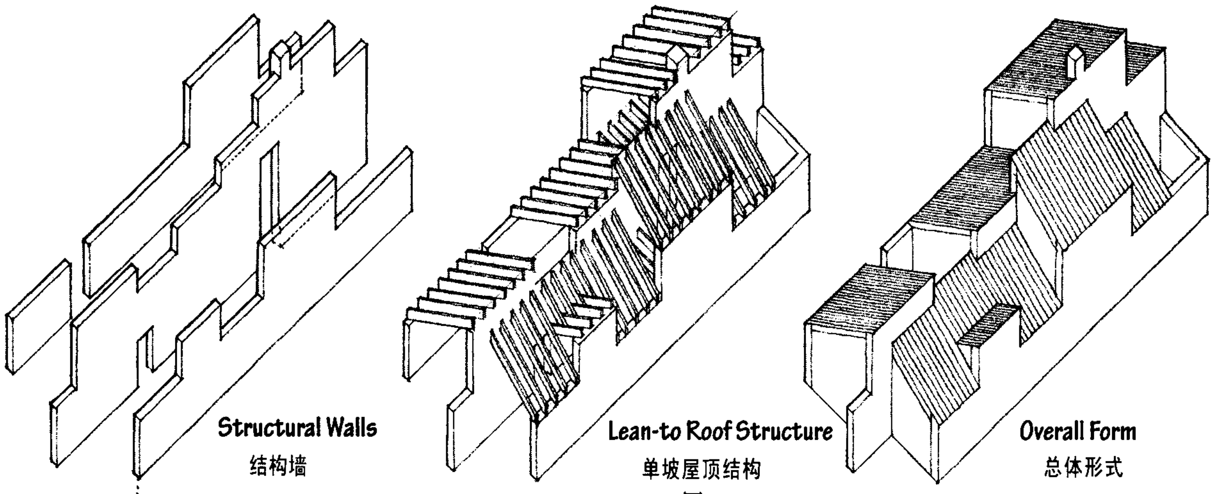
The slots of space defined by parallel wall planes can also be modulated by altering the spacing and configuration of the planes.

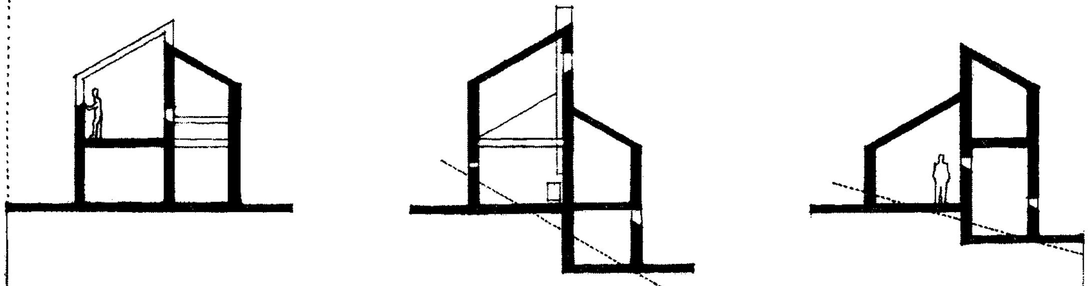
承重墙结构体系中的平行垂直面，可以作为建筑形式与组合背后的动力，可以变化墙面的长度来修饰其重复性的图案，也可以在面上引入空缺，以适应大空间的量度要求。这些空缺也可以限定流线轨迹，并建立起垂直于墙面的视觉关系。

由平行墙面所限定的空间缺口，也可以用间距变化和面的造型来加以调节。



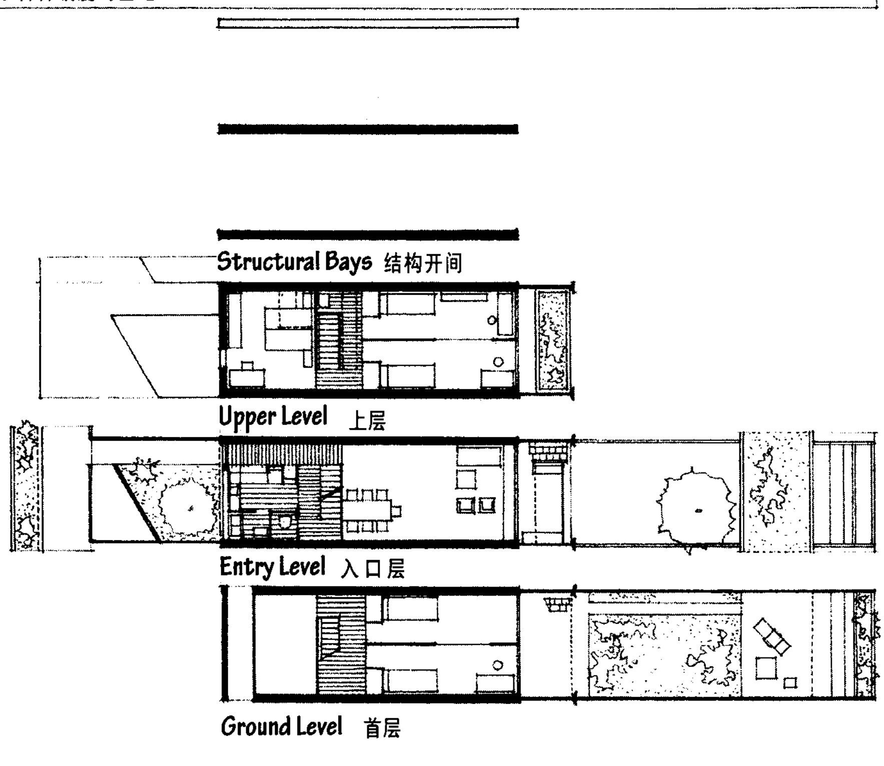
Arnheim Pavilion, *The Netherlands, 1966, Aldo van Eyck*
阿恩海姆陈列馆，荷兰，1966年， A.范艾克





Sections illustrating the adaptability of the scheme to various site slopes
剖面表明该方案适应于各种坡度的基地

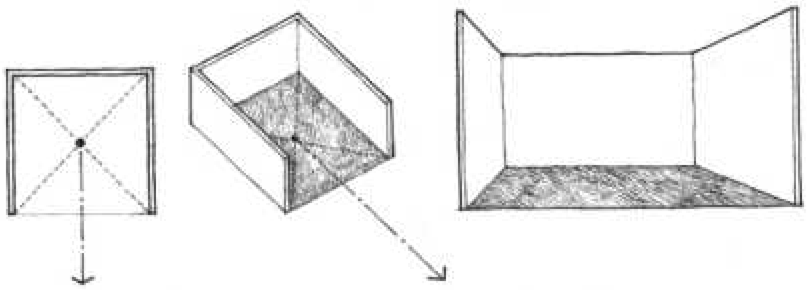
Village Project, 1955, James Stirling (Team X)
乡村设计方案，1955年，J.斯特林（十人组）



Siedlung Halen, near Bern, Switzerland, 1961, Atelier 5
塞德朗·海伦住宅，伯尔尼附近，瑞士，1961年，第5工作室

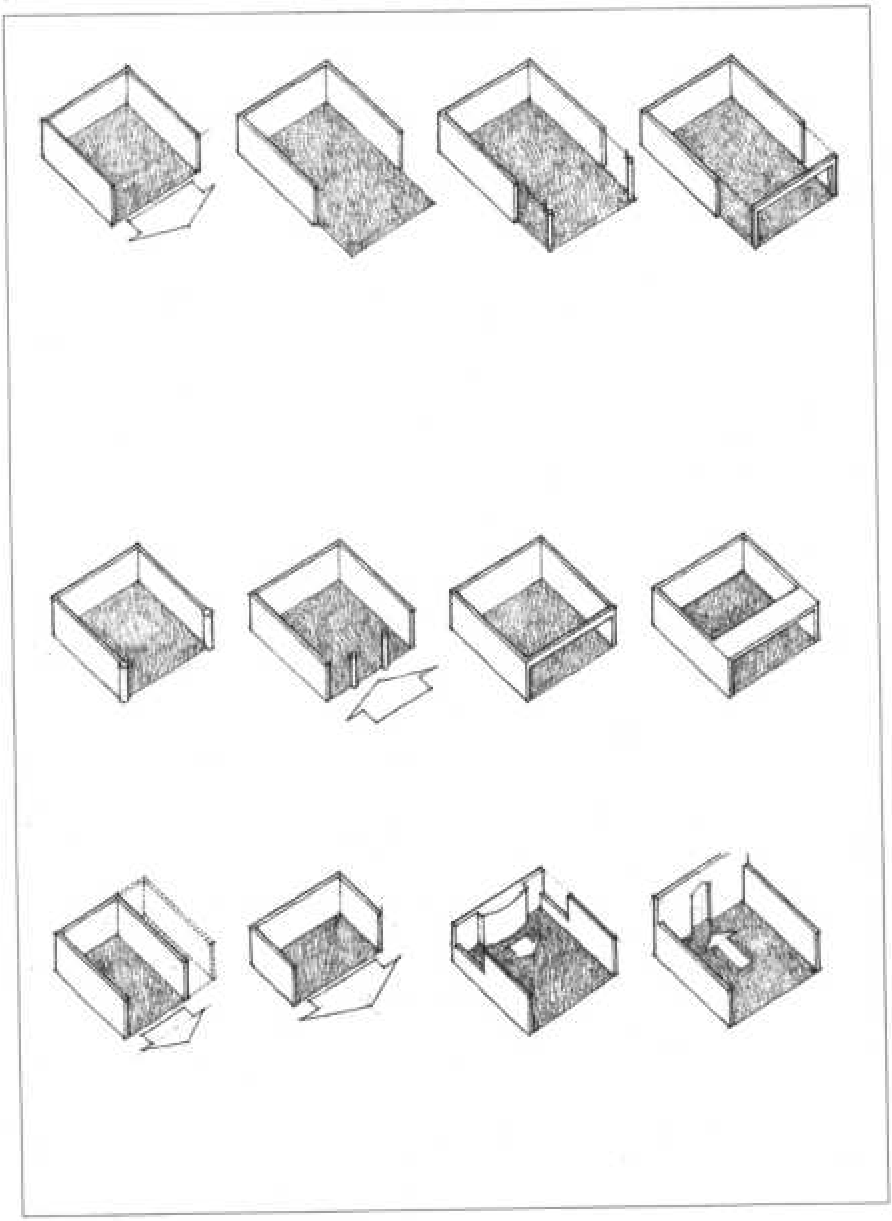
Parallel bearing walls are often used in multifamily housing developments. They not only provide structural support for the floors and roofs of each housing unit, but also serve to isolate the units from one another, curb the passage of sound, and check the spread of fire. The pattern of parallel bearing walls is particularly appropriate for rowhousing and townhouse schemes where each unit is provided with two orientations.

平行的承重墙常用于多户住宅扩建项目中。它们不仅为每个住宅单元的楼板和屋顶提供结构支撑，而且用来分离各个单元，阻断声音的通道并制止火势的蔓延。平行承重墙的形式，特别适于成排的房屋和联排别墅方案，其中每个单元都被赋予了两个方向。



A U-shaped configuration of vertical planes defines a field of space that has an inward focus as well as an outward orientation. At the closed end of the configuration, the field is well defined. Toward the open end of the configuration, the field becomes extroverted in nature.

垂直面的U形造型限定一个空间范围，它有一个内向的焦点，同时方向朝外。在造型的封闭端，该范围得到很好地界定。朝着造型的开放端，该领域变得具有外向性。



The open end is the primary aspect of the configuration by virtue of its uniqueness relative to the other three planes. It allows the field to have visual and spatial continuity with the adjoining space. The extension of the spatial field into the adjoining space can be visually reinforced by continuing the base plane beyond the open end of the configuration.

开放端是该造型的基本特征，因为相对于其他三个面而言，开放端具有独特性。它使得该领域与相邻的空间保持视觉上和空间上的连续性。把基面延伸到该造型的开放端以外，则可以在视觉上加强这个空间延伸到相邻空间的感觉。

If the plane of the opening is further defined with columns or overhead elements, the definition of the original field will be reinforced and continuity with the adjoining space will be interrupted.

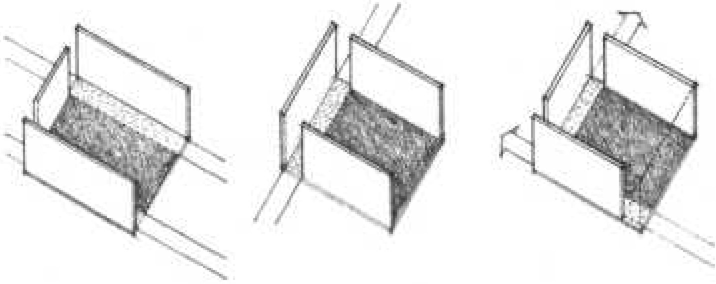
开敞的那个面，如果前面用柱子或顶上的要素进一步限定，那么原先那一范围的明确性将得到加强，但中断了它与相邻空间的连续性。

If the configuration of planes is rectangular and oblong in form, the open end can be along its narrow or wide side. In either case, the open end will remain the primary face of the spatial field, and the plane opposite the open end will be the principal element among the three planes of the configuration.

如果各个面的造型都为矩形且总体形式也是长方形时，那么开放端既可沿其窄边，也可在其宽面。不论哪种情形，开放端都将是这一空间范围的基本面孔，而与开放端相对的面将是该造型中三个面的关键要素。

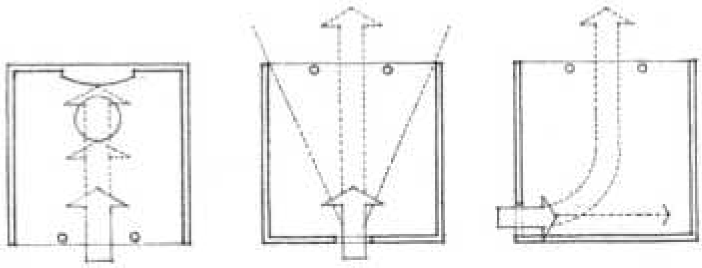
If openings are introduced at the corners of the configuration, secondary zones will be created within a multidirectional and dynamic field.

如果在造型的转角处引入开口，将会在多向性与充满动感的领域中产生几个次要地带。



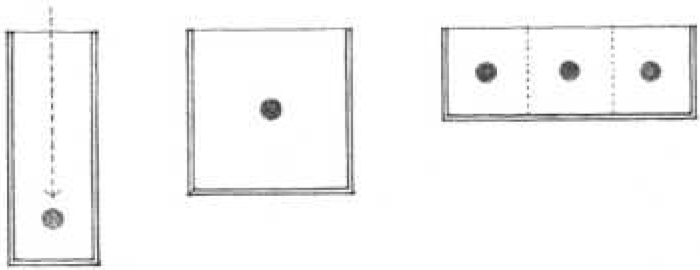
If the field is entered through the open end of the configuration, the rear plane, or a form placed in front of it, will terminate our view of the space. If the field is entered through an opening in one of the planes, the view of what lies beyond the open end will draw our attention and terminate the sequence.

如果穿越该造型的开放端进入该领域，那么它后部的面或在它前面放置的形体将结束我们在该空间中的视野。如果穿越某一面上的开口进入该领域，那么开放端以外的景象将会抓住我们的注意力，并结束序列。



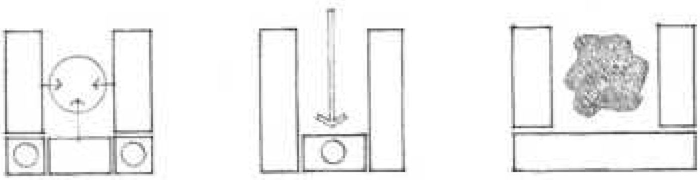
If the end of a long, narrow field is open, the space will encourage movement and induce a progression or sequence of events. If the field is square, or nearly square, the space will be static and have the character of a place to be in, rather than a space to move through. If the side of a long, narrow field is open, the space will be susceptible to a subdivision into a number of zones.

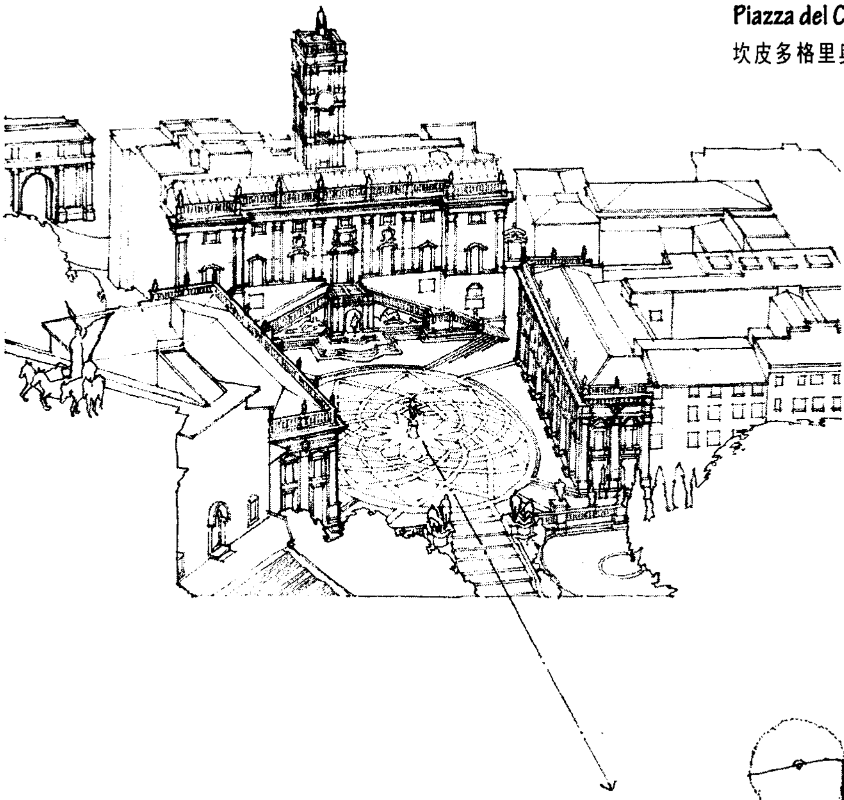
如果一个狭长领域的端部被打开，该空间将会促使运动，并导致一系列连续的或序列化的结果。如果该领域是正方形或接近正方形，该空间将会是静止的，并具有可以居于其中的场所特征，而不是一个穿越的空间。如果某个狭长领域的边被打开，那么这个空间将很容易地进一步划分成一些地带。



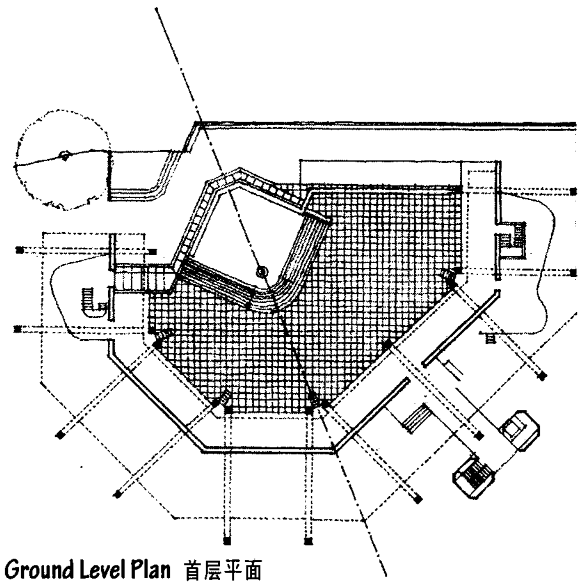
U-shaped configurations of building forms and organizations have the inherent ability to capture and define outdoor space. Their composition can be seen to consist essentially of linear forms. The corners of the configuration can be articulated as independent elements or can be incorporated into the body of the linear forms.

建筑形体的U形造型与组合，在围合与限定室外空间方面具有天然的能力。可以看出，它们的构图本质上是由线式形体组成的。该构图的转角处可以被明确地表达为独立的要素，或者被结合到线式形体的体量中。



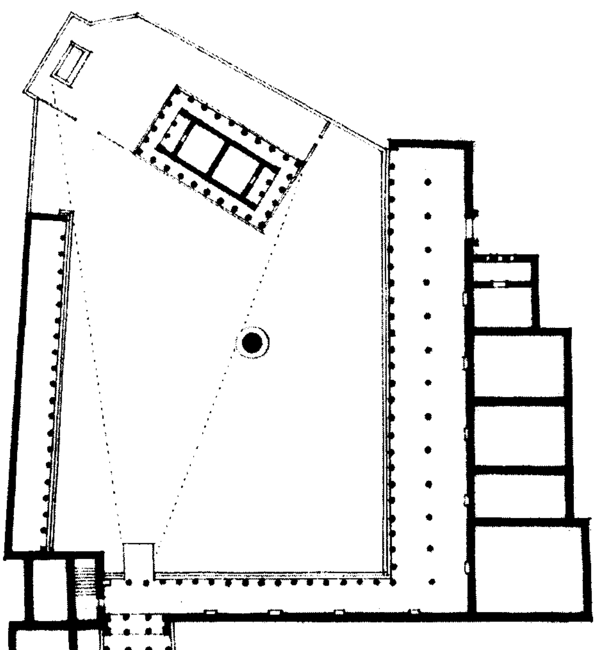


Piazza del Campidoglio, Rome, c. 1544, Michelangelo
坎皮多格里奥广场，罗马，1544年，米开朗琪罗



Ground Level Plan 首层平面

Florey Building, Queen's College, Oxford, 1966–1971, James Stirling
弗洛里大楼，皇后学院，牛津，1966年—1971年，J. 斯特林



Sacred Precinct of Athena, Pergamon, Asia Minor, 4th century B.C.
雅典娜的圣地、波尔加蒙、小亚细亚、公元前4世纪

U-shaped configurations of building forms can serve to define an urban space and terminate an axial condition. They can also focus on an important or significant element within their fields. When an element is placed along the open end of its field, it gives the field a point of focus as well as a greater sense of closure.

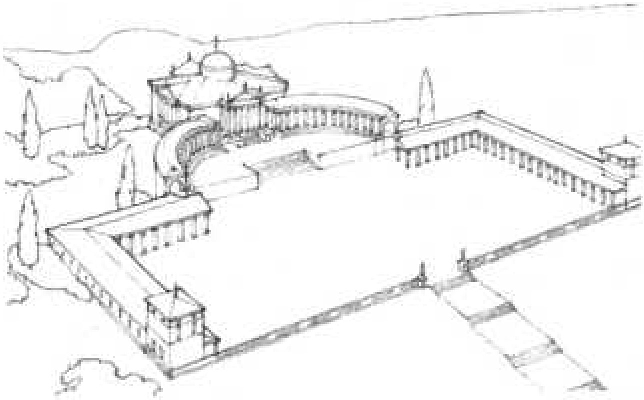
建筑形体的U形造型，可以用来限定一个城市空间，结束一条轴线，也可以在其范围内聚焦于一个重要的或有重大意义的要素。当某一要素沿着该领域的开放端布置的时候，它就形成了这一领域的焦点，并且有一种很强的围护感。

A U-shaped building form can serve as a container and can organize within its field a cluster of forms and spaces.

U形的建筑形体可以当作一个容器，在它所包容的空间范围内，可以组织空间群和形体组团。

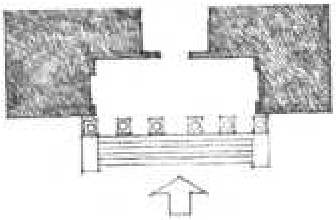
The U-shaped organization can also define a forecourt for the approach to a building as well as form an entrance recessed within the building volume.

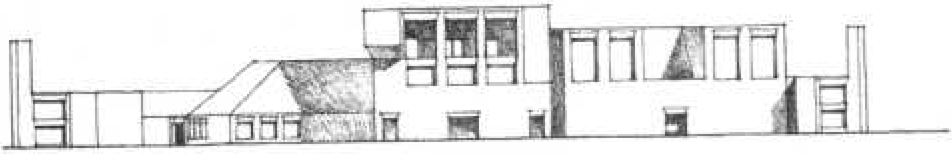
U形组合也可以限定出一个通向建筑物入口的前院，同时形成建筑体内入口处的休息空间。



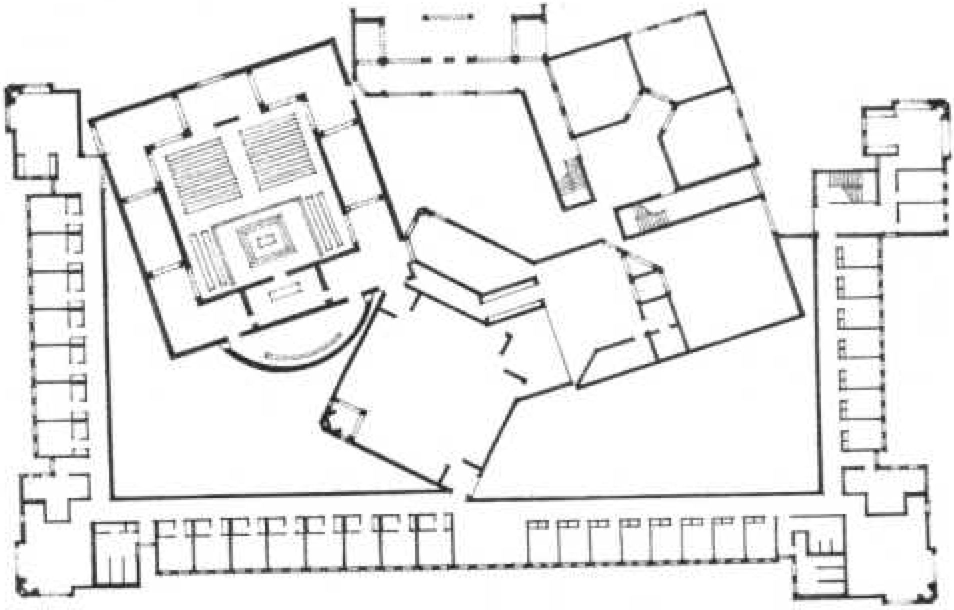
Villa Trissino at Meledo, From *The Four Books on Architecture*, Andrea Palladio

梅莱多的特利森诺别墅，选自《建筑学四书》，A. 帕拉第奥





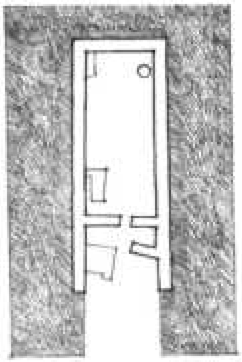
Front Elevation 正立面



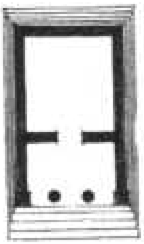
Plan 平面

Convent for the Dominican Sisters, project, Media, Pennsylvania, 1965–1968, Louis Kahn.
The cells form an enclave for a village of community rooms.

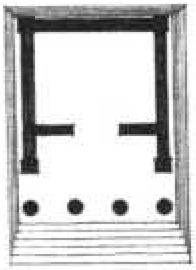
多明尼加修女修道院，方案，梅迪亚，宾夕法尼亚州，1965年—1968年，L.康
修道院的房间围起一片区域，构成了社区用房的村落。



Early Megaron Space
Principal room or hall of an early Anatolian or Aegean house
早期的中室空间
早期安纳托利亚或爱琴住宅的厅或主要房间

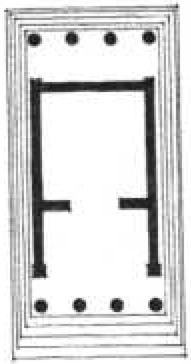


Temple of Nemesis,
Rhamnus
涅米西斯神庙，拉姆纳斯



Temple "B,"
Selinus
"B"神庙，塞林纳斯

Plans of Greek Temples
希腊神庙的平面



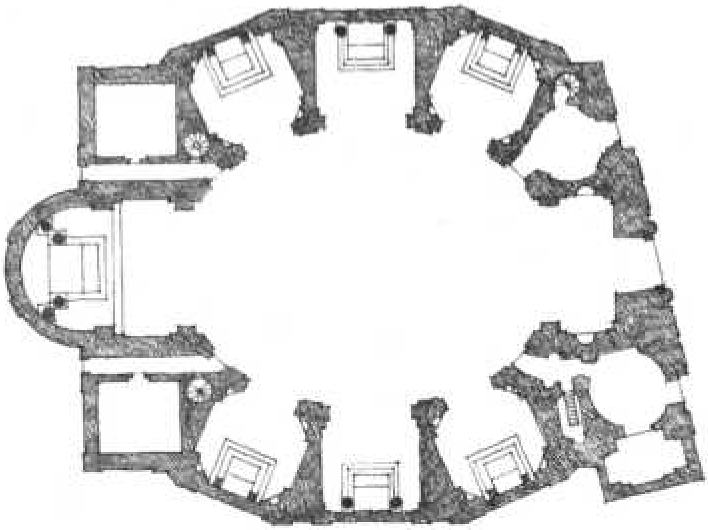
Temple on the Ilissus,
Athens
伊利索斯的神庙，雅典

U-shaped enclosures of interior space have a specific orientation toward their open ends. These U-shaped enclosures can group themselves around a central space to form an introverted organization.

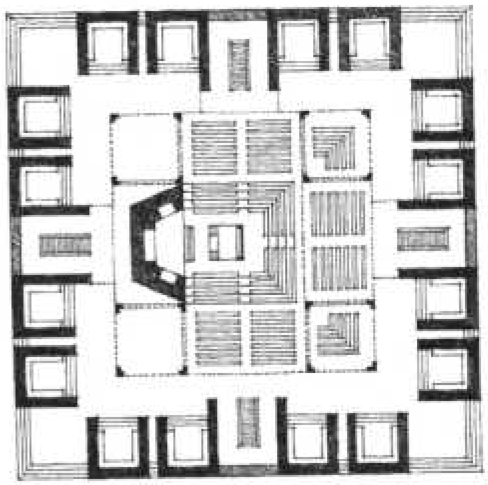
室内空间的U形围合具有明确的方向性，指向开放端。这些U形的围合空间能够围绕一个中央空间成群布置，从而形成一种内向的组合。

The Hotel for Students at Otaniemi, by Alvar Aalto, demonstrates the use of U-shaped enclosures to define the basic unit of space in double-loaded schemes for dormitories, apartment, and hotels. These units are extroverted. They turn their back on the corridor and orient themselves to the exterior environment.

A.阿尔托设计的奥塔涅米学生旅馆，表明在双重荷载的宿舍、公寓和旅馆的设计方案中，运用U形围合来限定基本的空间单元。这些单元都是外向的。它们背朝走廊，本身则朝向外部环境。



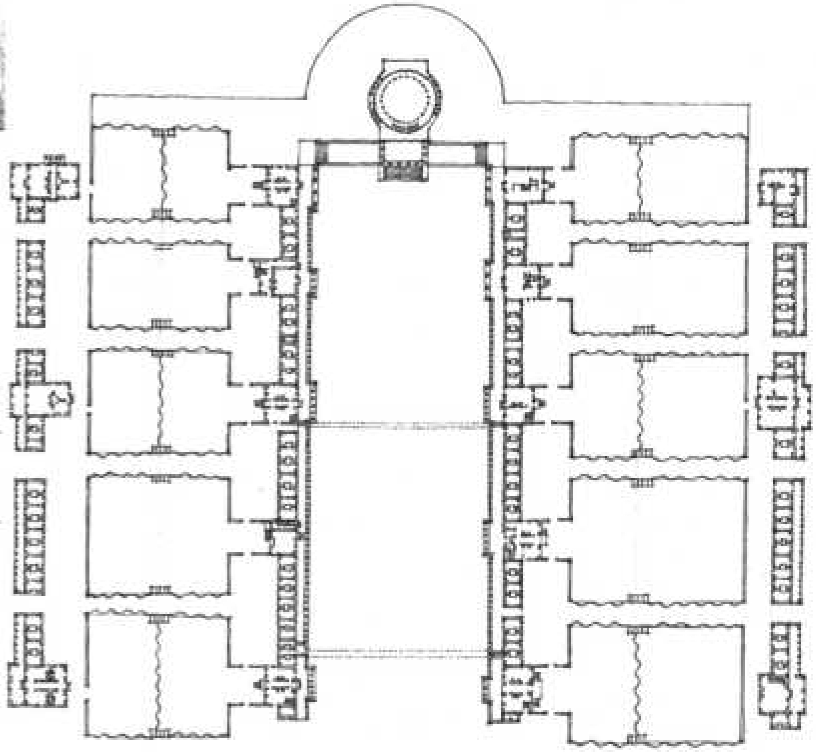
Sketch of an Oval Church by Borromini, Genesis of San Carlo Alle Quattro Fontane
博洛米尼所作的椭圆形教堂草图，圣卡洛四泉教堂



Hurva Synagogue (project), Jerusalem, 1968, Louis Kahn
胡瓦犹太教堂（方案），耶路撒冷，1968年，L.康



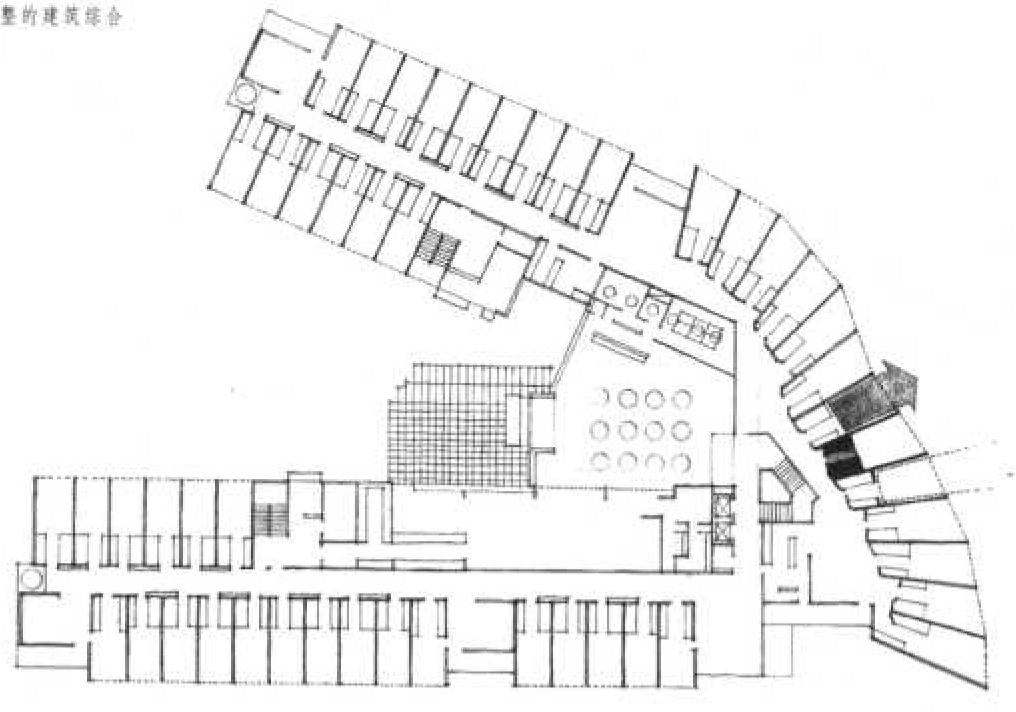
A Niche in a Wall
墙中的壁龛



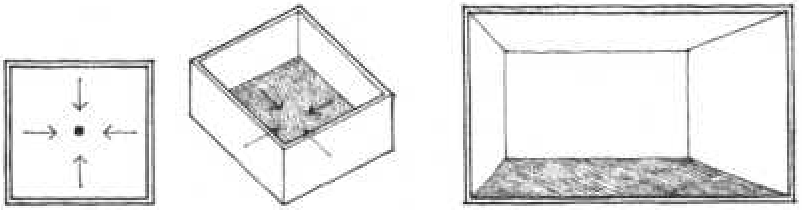
University of Virginia, Charlottesville, Virginia, 1817–1826, Thomas Jefferson with Thornton and Latrobe
弗吉尼亚大学，夏洛茨维尔，弗吉尼亚州，1817年—1826年，T. 杰斐逊与索顿和拉特罗比

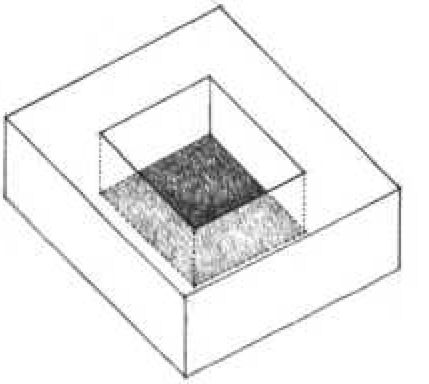
U-shaped enclosures of space can range in scale from a niche in the wall of a room, to a hotel or dormitory room, and on to an arcaded outdoor space that organizes an entire complex of buildings.

空间的U形围合，可以在尺度上有很大变化。从房间中墙内的壁龛，到旅馆或宿舍的房间，以至带有拱廊的室外空间，组成一个完整的建筑综合体。



Hotel for Students at Otaniemi, Finland, 1962–1966, Alvar Aalto
奥塔涅米的学生旅馆，芬兰，1962年—1966年，A. 阿尔托





Four vertical planes encompassing a field of space is probably the most typical, and certainly the strongest, type of spatial definition in architecture. Since the field is completely enclosed, its space is naturally introverted. To achieve visual dominance within a space or become its primary face, one of the enclosing planes can be differentiated from the others by its size, form, surface articulation, or by the nature of the openings within it.

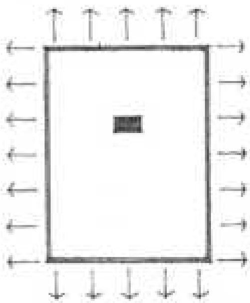
四个垂直面围绕一个空间领域，大概这是建筑空间限定方式中最为典型的，当然也是限定作用最强的类型。由于该领域被完全地围合起来，所以它的空间自然是内向的。为了在一个空间中获得视觉上的支配地位，或者成为空间的主要立面，其中一个围合面可以在尺寸、形式、表面处理方式或开洞的种类等方面不同于其他面。

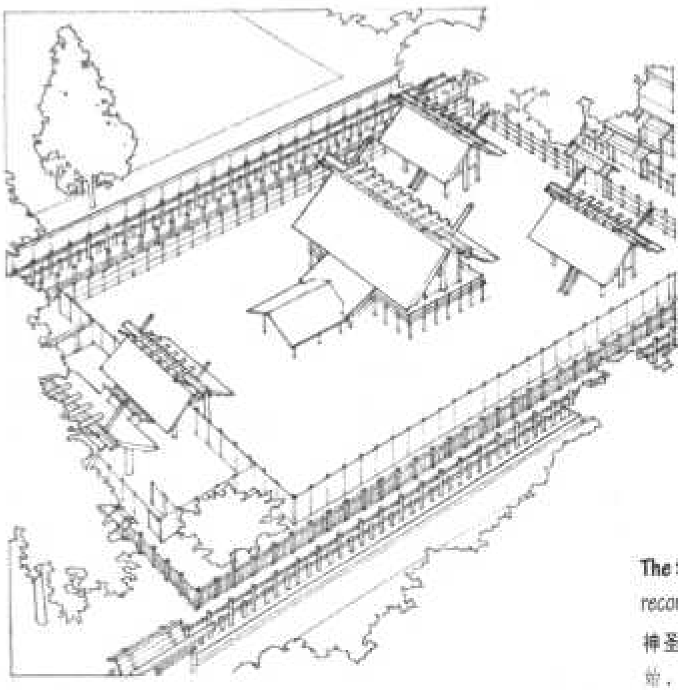
Well-defined, enclosed fields of space can be found in architecture at various scales, from a large urban square, to a courtyard or atrium space, to a single hall or room within a building complex. The examples on this and the following pages illustrate enclosed spatial fields in both urban and building-scale situations.

明确限定和围合的空间领域，在各种尺度的建筑物中都可以找到，从大型的城市广场，到庭院或中庭空间，以至建筑综合体中的独立厅、室。这里的案例和随后几页的实例说明了围合空间领域在城市尺度和建筑尺度中的运用。

Historically, four planes have often been used to define a visual and spatial field for a sacred or significant building that stands as an object within the enclosure. The enclosing planes may be ramparts, walls, or fences that isolate the field and exclude surrounding elements from the precinct.

以往，为了突出一个立于围合之中、作为目标的神圣建筑或重要建筑，四个面常被用来限定一个视觉范围或空间领域。用于围合的面可以是堡垒、墙体或栅栏，它们分离出一个区域，并把周围要素排除在这一区域之外。



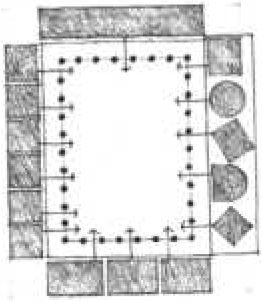


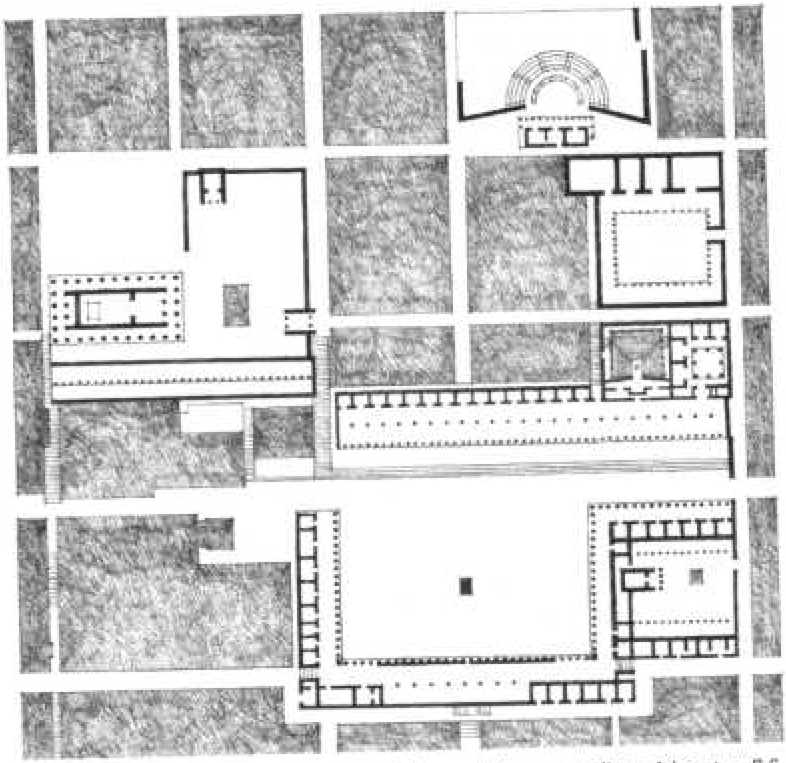
The Sacred Enclosure, Ise Shrine, Mie Prefecture, Japan, reconstructed every 20 years since A.D. 690.

神圣的围护物，伊势神社，三重县，日本，从690年开始，每隔20年重建一次。

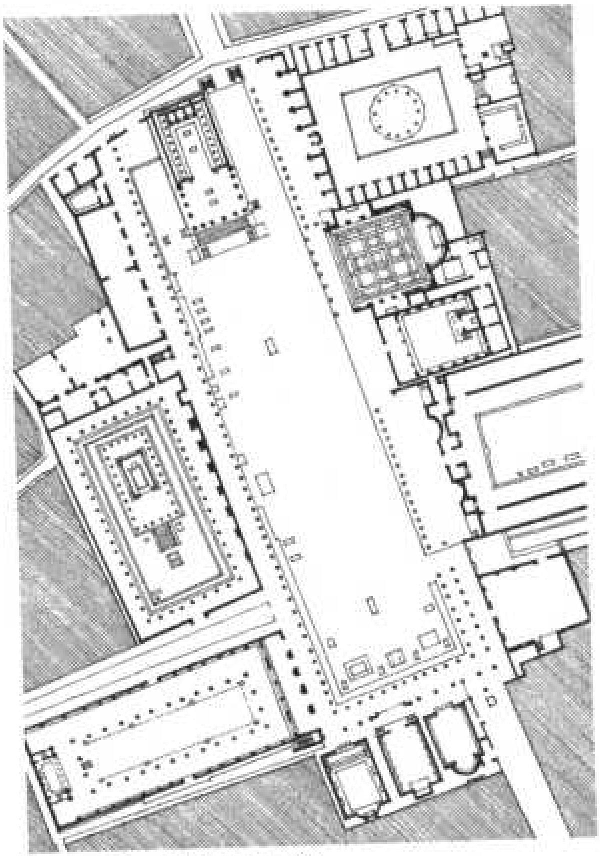
In an urban context, a defined field of space can organize a series of buildings along its perimeter. The enclosure may consist of arcades or gallery spaces that promote the inclusion of surrounding buildings into their domain and activate the space they define.

在城市脉络中，一个限定的空间区域能够沿其周边组织一系列的建筑物。围合部分可能包括拱廊或柱廊的空间，这些空间有利于增进其领地对周围建筑的包容感，同时使它们所限定的空间充满活力。

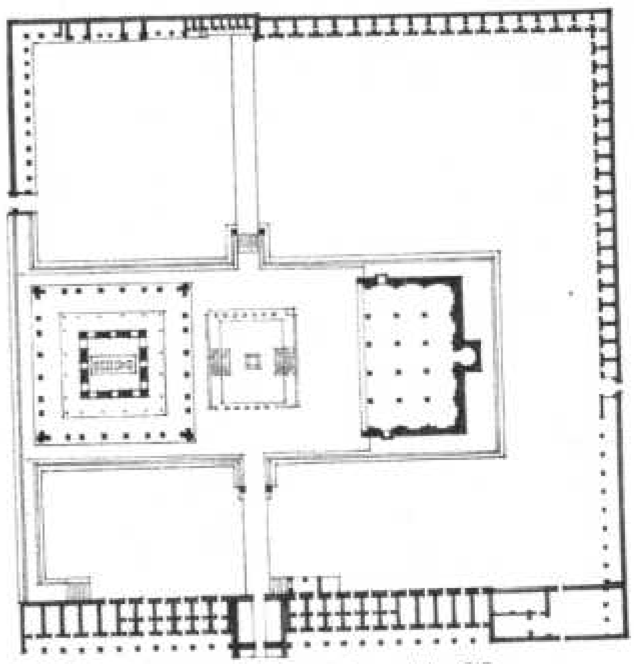




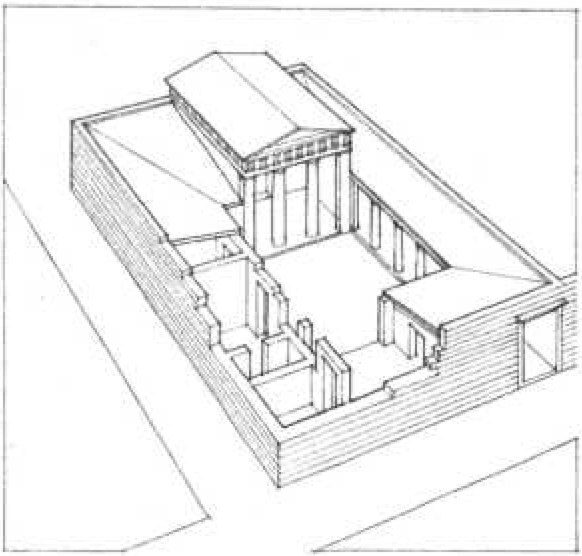
Plan of the Agora at Priene and its surroundings, 4th century B.C.
普瑞恩市场平面及其周围环境，公元前4世纪



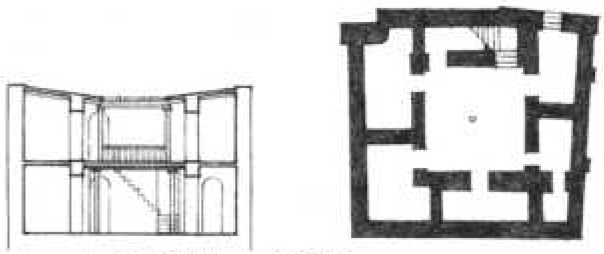
Forum at Pompeii, 2nd century B.C.
庞培的公共集会地，公元前2世纪



Ibrahim Rauza, Tomb of Sultan Ibrahim II, Bijapur, India, 1615
易卜拉欣·洛查，易卜拉欣二世苏丹的陵墓，比佳普尔，印度，1615年



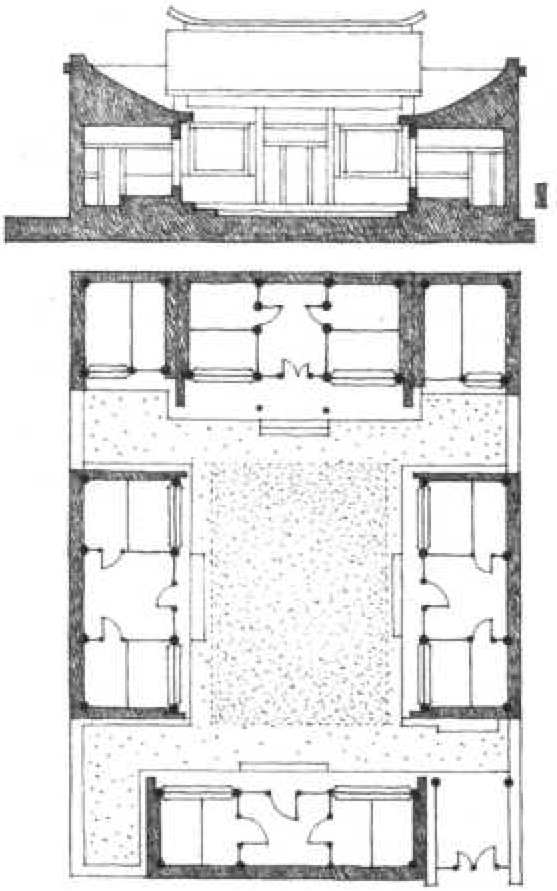
House No. 33, Priene, c. 3rd century B.C.
33号住宅，普瑞恩，公元前3世纪



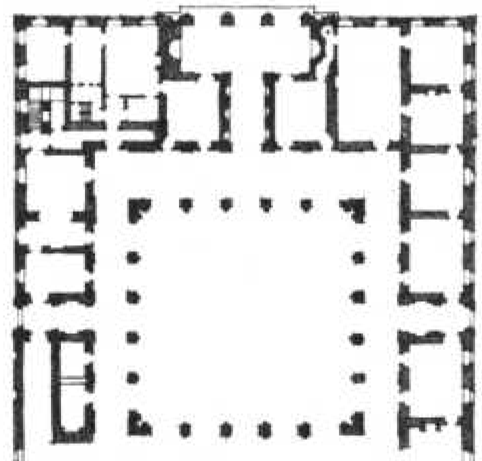
House, Ur of the Chaldees, c. 2000 B.C.
住宅，加勒底的乌尔，公元前2000年

The examples on these two pages illustrate the use of enclosed volumes of space as ordering elements about which the spaces of a building can be clustered and organized. These organizing spaces can generally be characterized by their centrality, their clarity of definition, their regularity of form, and their dominating size. They are manifested here in the atrium spaces of houses, the arcaded cortile of an Italian palazzo, the enclosure of a Greek shrine, the courtyard of a Finnish town hall, and the cloister of a monastery.

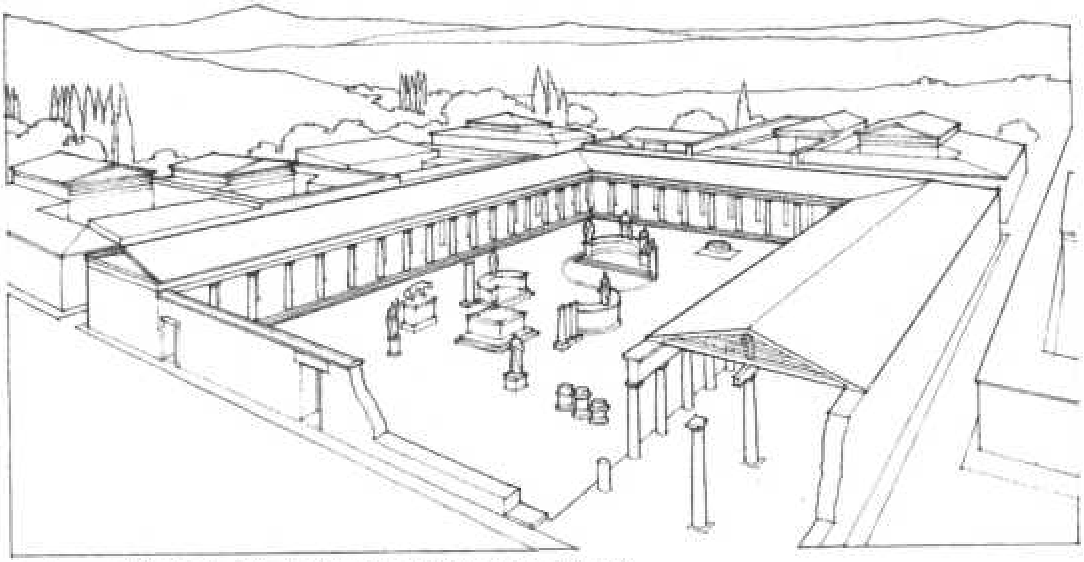
这两页上的例子说明，如果运用围合起来的空间容积作为秩序要素，那么围绕这些要素，建筑空间就能够聚合成群并得到有效组织。这些经过组织的空间，一般具有如下特征：向心性、限定明确、形体规则以及居于主导地位的尺度。在这里，这类特征表现在住宅建筑的中庭空间、意大利府邸的拱廊内院、希腊神庙的围廊、芬兰市政厅的庭院，以及修道院的回廊。



Chinese Patio House
中国四合院住宅

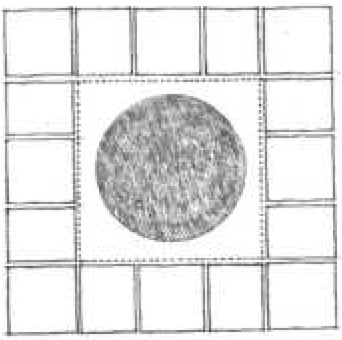


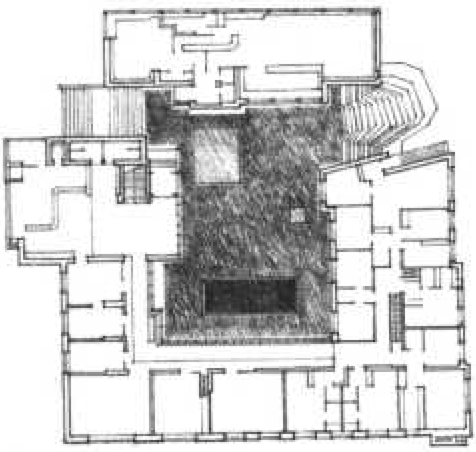
Palazzo Farnese, Rome, 1515, Antonio da Sangallo the Younger
法尼斯府邸，罗马，1515年，A. 达圣加罗（小）



Enclosure of the Shrine of Apollo Delphinios, Miletus, c. 2nd century B.C.

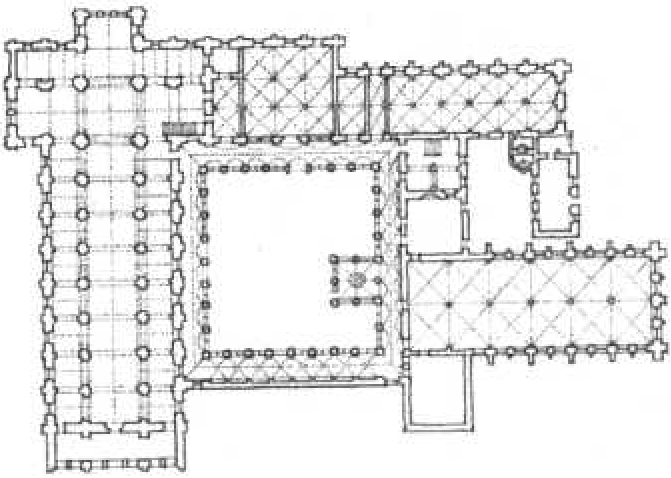
A. 德尔菲尼亚斯圣地的围护物，米勒图斯，公元前2世纪





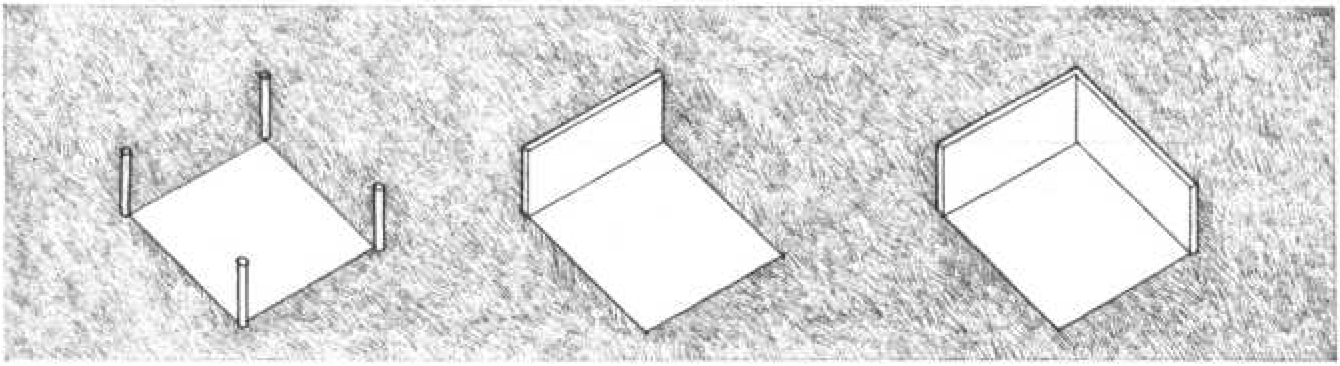
Town Hall, Säynätsalo, Finland, 1950–1952, Alvar Aalto

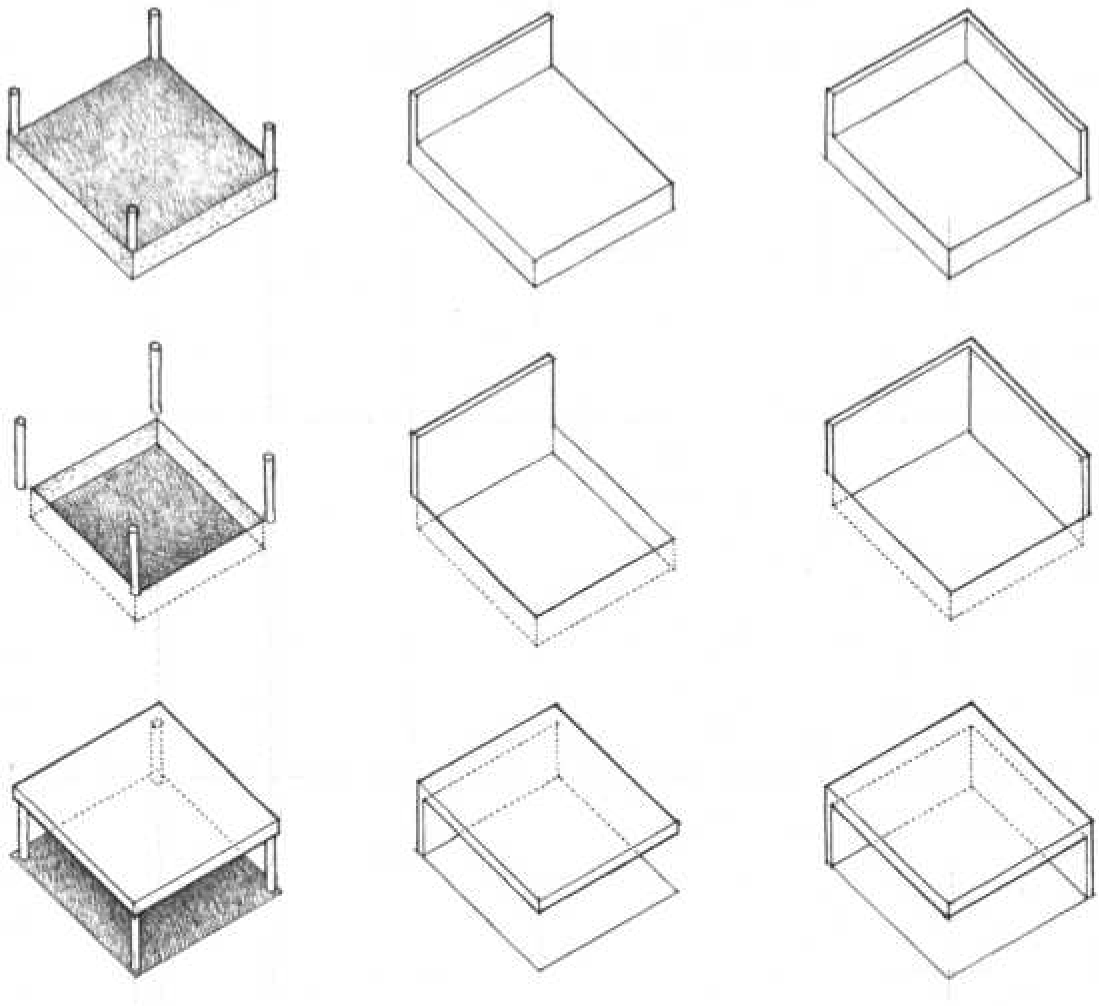
市政厅，赛纳特萨罗，芬兰，1950年—1952年，A. 阿尔托

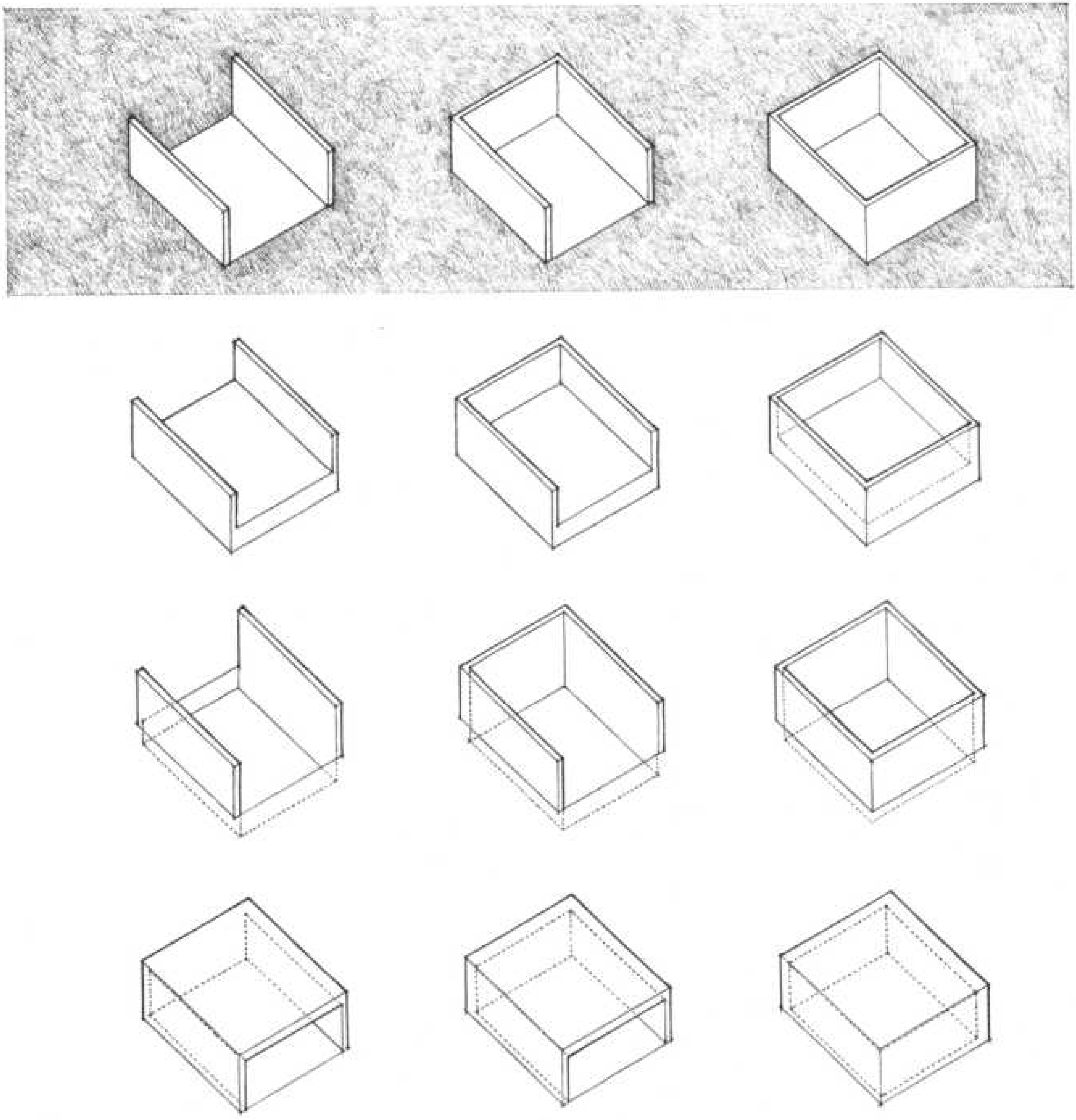


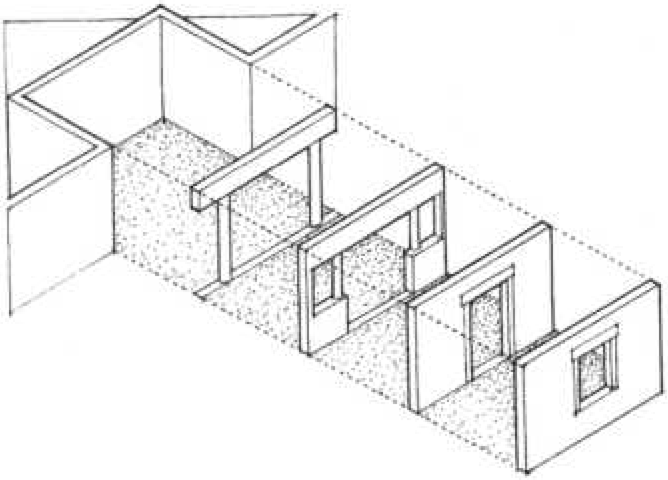
Fontenay Abbey, Burgundy, France, c. 1139

韦特内修道院，波冈蒂，法国，1139年









No spatial or visual continuity is possible with adjacent spaces without openings in the enclosing planes of a spatial field. Doors offer entry into a room and determine the patterns of movement and use within it. Windows allow light to penetrate the space and illuminate the surfaces of a room, offer views from the room to the exterior, establish visual relationships between the room and adjacent spaces, and provide for the natural ventilation of the space.

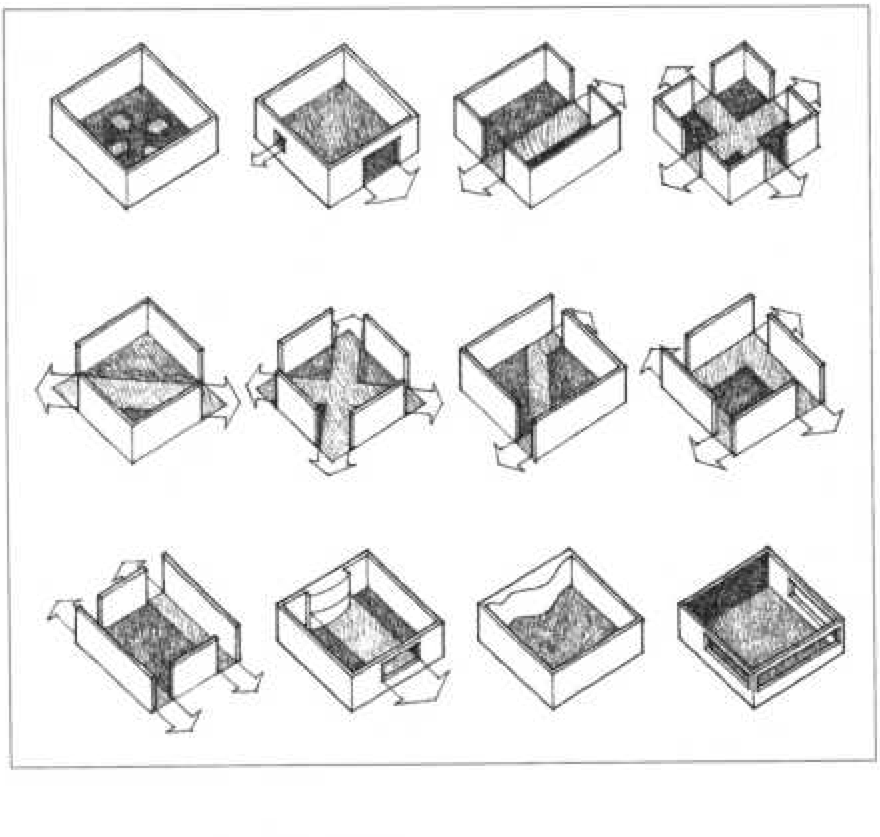
While these openings provide continuity with adjacent spaces, they can, depending on their size, number, and location, begin to weaken the enclosure of the space. These openings also affect the orientation and flow of the space, its quality of light, its outlook and views, and the pattern of use and movement within it.

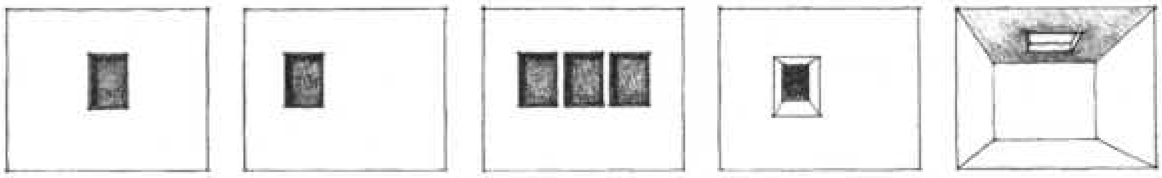
The following section of this chapter focuses on enclosed spaces at the scale of a room, where the nature of the openings within the room's enclosure is a major factor in determining the quality of its space.

如果没有空间领域围合面上的开洞，那么在视觉上或空间上与邻近空间的连续性都是不可能的。门提供了进入房间的入口，同时决定了房间中的运动模式和用途。窗户让光线射入空间，照亮了房间的四壁，提供了从室内到室外的视野，在房间与邻近的空间中建立起视觉联系，并提供了空间中的自然通风。

在提供与邻近空间连续性的同时，这些开洞也开始削弱空间的围合，当然这要视开洞的大小，数量和位置而定。这些开洞也影响到空间的方向与空间的流动，如空间中光的特性、景色与视野以及空间内部的应用模式和运动模式。

本章的其余部分，将集中在一个房间的尺度上讨论围合空间，其中在房间的围护结构上开洞的特征是决定其空间特性的一个主要因素。



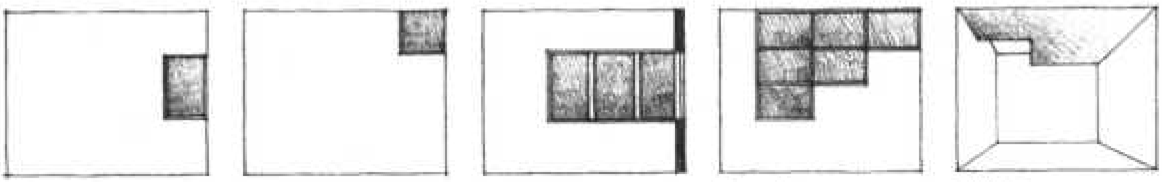


Centered 居中 | Off-Center 偏离中心 | Grouped 成组 | Deep-set 深陷 | Skylight 天窗

Within Planes
在面上

An opening can be located wholly within a wall or ceiling plane and be surrounded on all sides by the surface of the plane.

一个洞口可以全部位于墙面或顶棚之中，各个边都被周围的面所环绕。

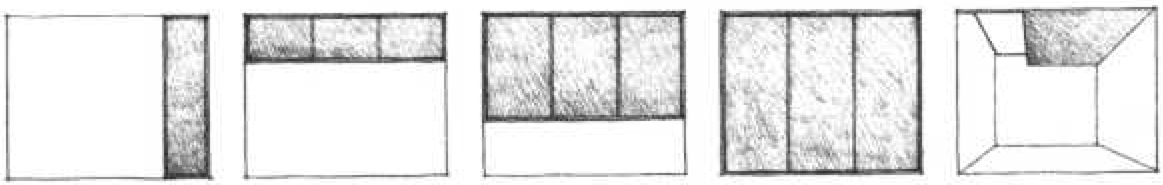


Along one edge 沿一条边 | Along two edges 沿两条边 | Turning a corner 转角 | Grouped 成组 | Skylight 天窗

At Corners
在转角

An opening can be located along one edge or at a corner of a wall or ceiling plane. In either case, the opening will be at a corner of a space.

一个洞口可以沿着墙面或顶面的一边，或在墙面或顶面的转角处布置。在这两种情形下，该洞口都将位于空间的转角处。

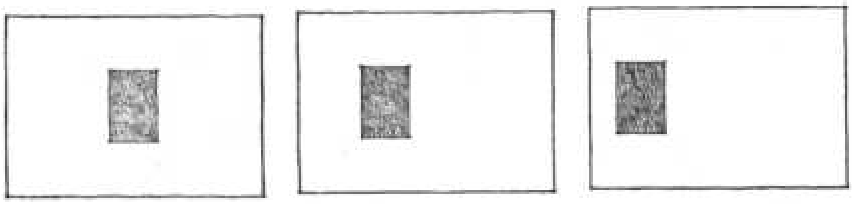


Vertical 竖向的 | Horizontal 横向的 | 3/4 Opening 3/4开洞 | Window-wall 以窗为墙 | Skylight 天窗

Between Planes
在面与面之间

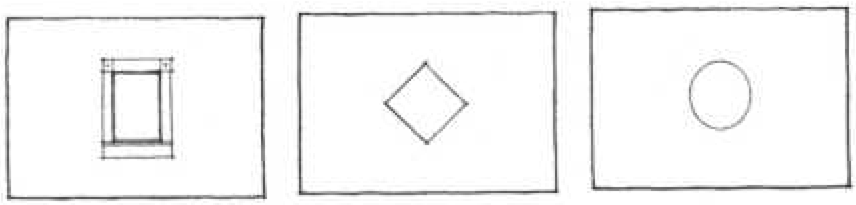
An opening can extend vertically between the floor and ceiling planes or horizontally between two wall planes. It can grow in size to occupy an entire wall of a space.

一个洞口可以在地面与顶棚之间竖向延伸，也可以在两墙面之间横向延伸。其尺寸可以不断增大，以至于占据一个空间的整面墙。



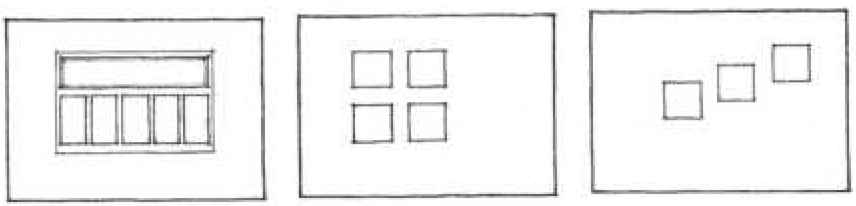
An opening located wholly within a wall or ceiling plane often appears as a bright figure on a contrasting field or background. If centered within the plane, the opening will appear stable and visually organize the surface around it. Moving the opening off-center will create a degree of visual tension between the opening and the edges of the plane toward which it is moved.

洞口整个位于墙面或顶面上时，常常是作为一个明亮的形象，出现在一个反差很大的区域或背景上。如果洞口处于面的中心，将会呈现出稳定的状态，并在视觉上把围绕着它的表面组织起来。将洞口从中心移开，洞口和洞口向其移动的平面边缘之间，将会产生一定程度的视觉紧张感。



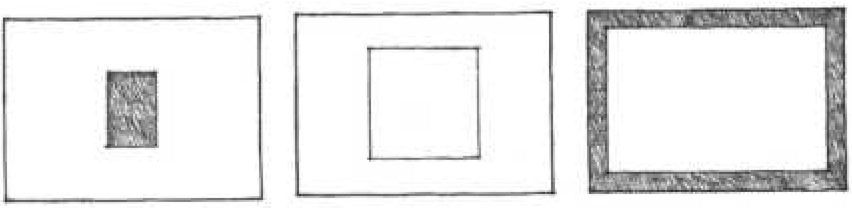
The shape of the opening, if similar to the shape of the plane in which it is located, will create a redundant compositional pattern. The shape or orientation of the opening may contrast with the enclosing plane to emphasize its individuality as a figure. The singularity of the opening may be visually reinforced with a heavy frame or articulated trimwork.

如果洞口的形状与其所在面的形状相似，那么将会产生一种重复的构图模式。洞口的形状与方位可以与围护面形成对比，以强调洞口作为一个图形的特征。可以通过厚重的框子或清晰的修边，使洞口的特色在视觉上得到加强。



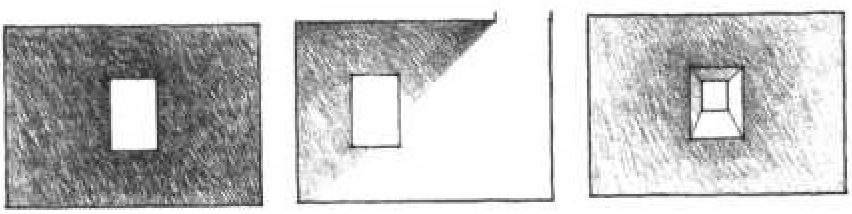
Multiple openings may be clustered to form a unified composition within a plane, or be staggered or dispersed to create visual movement along the surface of the plane.

多个开洞可以成组布置，在面内形成一个统一的构图，也可以交错或分散布置，以形成沿着表面的视觉运动。



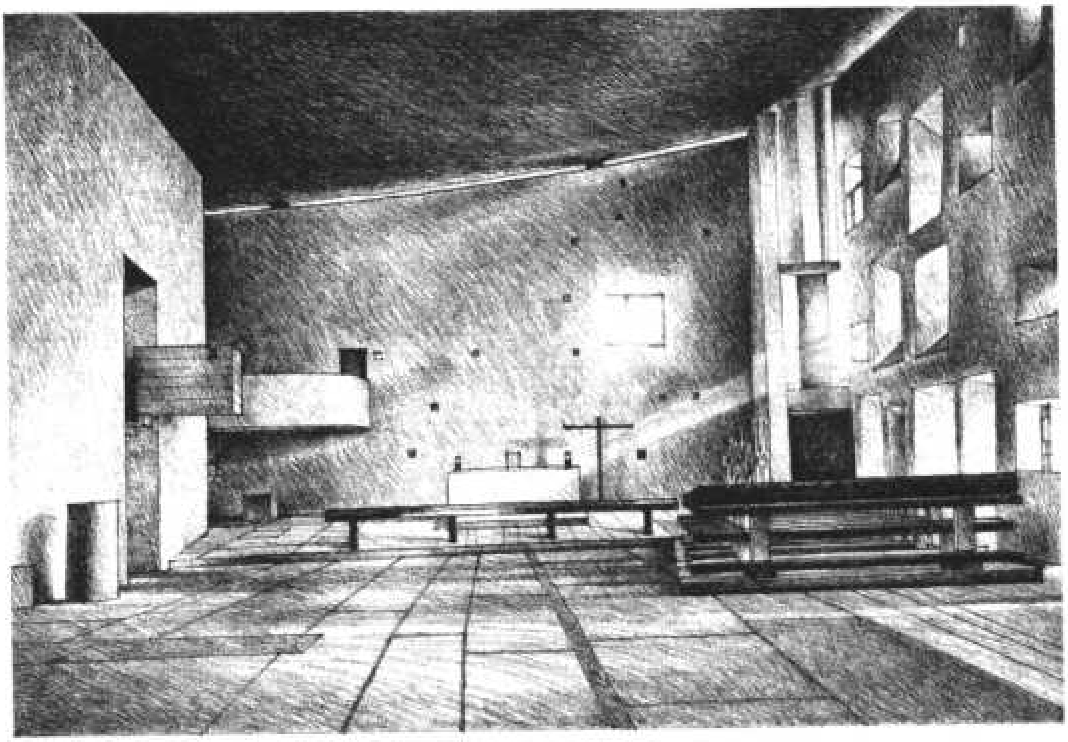
As an opening within a plane increases in size, it will at some point cease to be a figure within an enclosing field and become instead a positive element in itself, a transparent plane bounded by a heavy frame.

随着面内洞口尺寸的不断增大，到达一定程度后，洞口将不再是封闭区域内的一个图形，本身则变成一个积极的要素，一个周边镶有重框的透明的面。



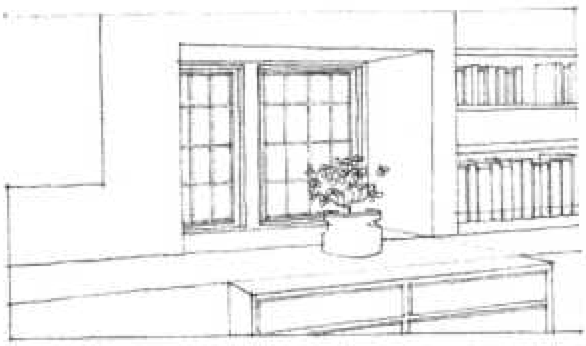
Openings within planes naturally appear brighter than their adjacent surfaces. If the contrast in brightness along the edges of the openings becomes excessive, the surfaces can be illuminated by a second light source from within the space, or a deep-set opening can be formed to create illuminated surfaces between the opening and the surrounding plane.

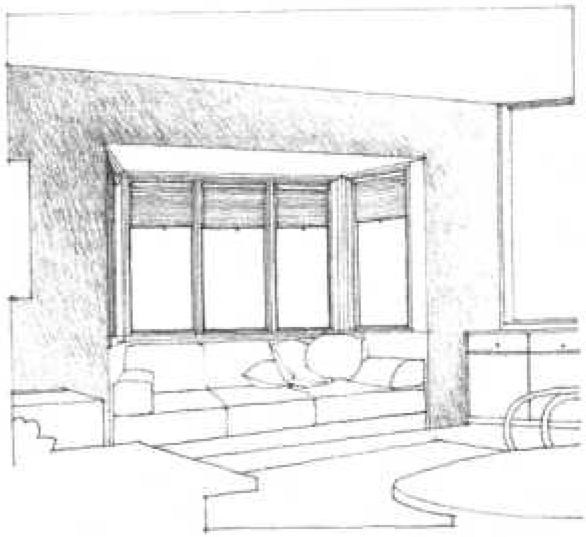
面上的洞口当然要比旁边的面更明亮。如果沿着洞口的边缘，亮度对比过于强烈，那么可以用来自室内空间的第二光源照射表面，或者做成深陷的洞口，目的是在洞口与周围面之间形成光亮的表面。

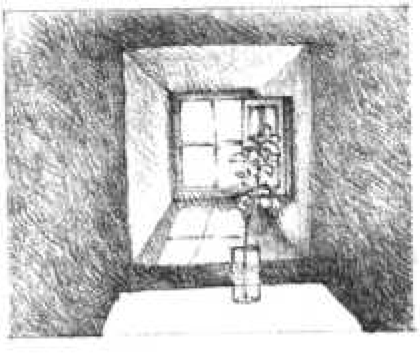


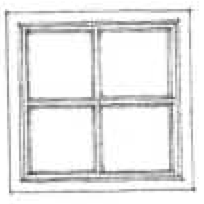
Chapel Space, Notre Dame Du Haut, Ronchamp, France, 1950–1955, Le Corbusier

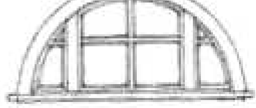
教堂空间，圣母教堂，朗香，法国，1950年—1955年，勒·柯布西埃

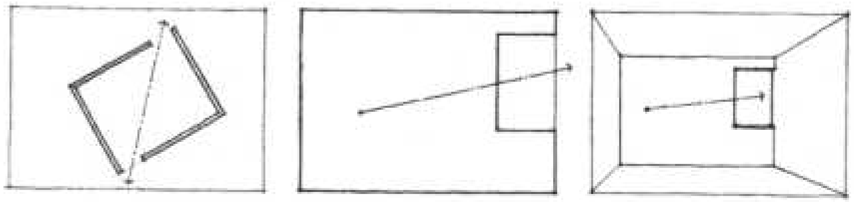






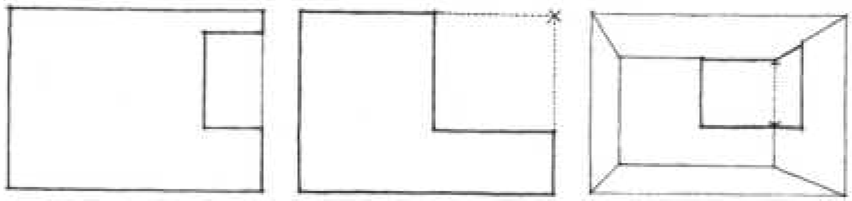






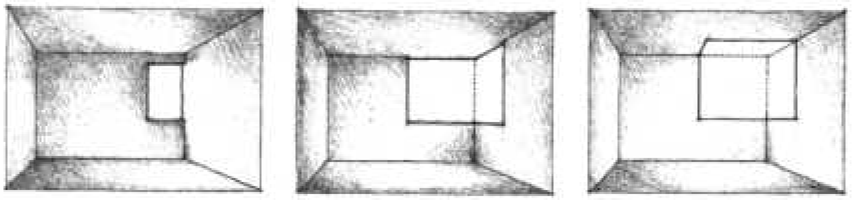
Openings that are located at corners give a space and the planes in which they are located a diagonal orientation. This directional effect may be desirable for compositional reasons, or the corner opening may be established to capture a desirable view or brighten a dark corner of a space.

位于角上的洞口，将给予空间和洞口所在的面一种呈对角线的方向性。这种方向性效果，或者是构图原因所需要的，或者在角上开洞来捕获所需要的景观，或者是为了照亮空间中的黑暗角落。



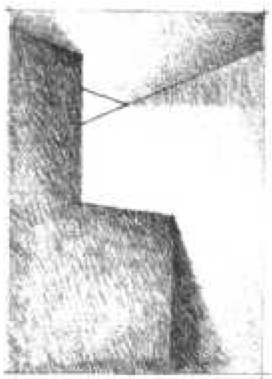
A corner opening visually erodes the edges of the plane in which it is located and articulates the edge of the plane adjacent and perpendicular to it. The larger the opening, the weaker will be the definition of the corner. If the opening were to turn the corner, the angle of the space would be implied rather than real and the spatial field would extend beyond its enclosing planes.

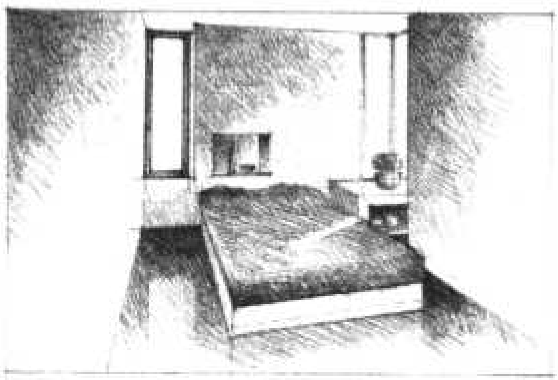
位于角上的洞口，在视觉上会吞食掉所处面的边缘，并且将连接与它相邻而垂直于它的面。洞口越大，角的限定就越弱。如果洞口是转角式的，那么空间中的角将是含蓄的，而并非真正存在，并且空间范围将会延伸到围合面以外。



If openings are introduced between the enclosing planes at all four corners of a space, the individual identity of the planes will be reinforced and diagonal or pinwheel patterns of space, use, and movement will be encouraged.

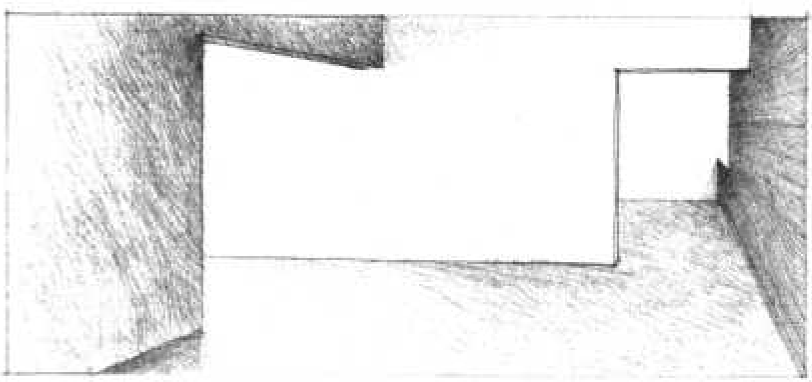
如果在一个空间的所有的四个转角处的闭合面之间都引入洞口，那么面的独特性将会得到加强，于是在空间、用途、运动等方面，对角线式或风车模式将会得到推广。

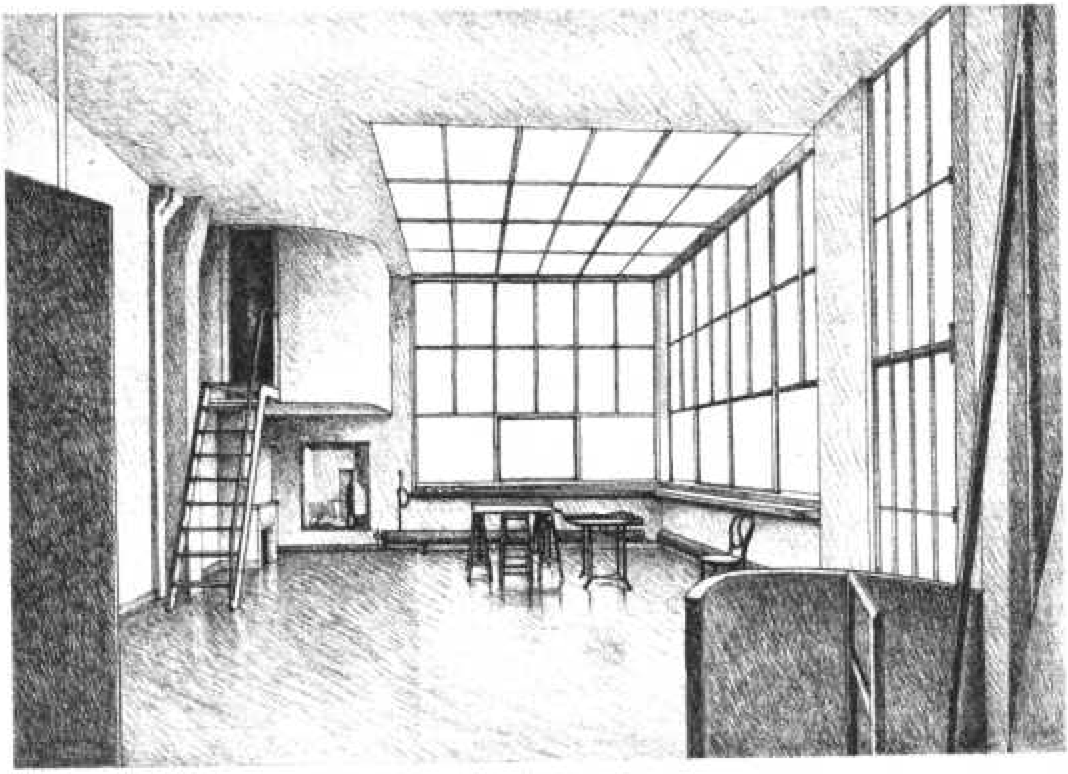




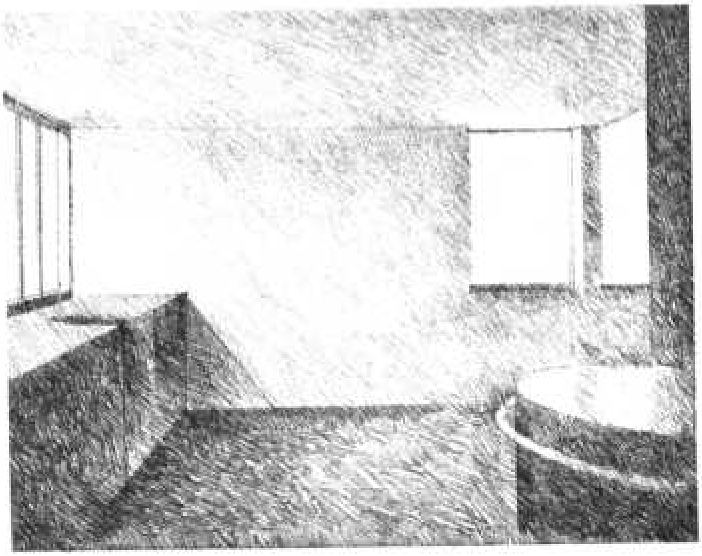
The light that enters a space through a corner opening washes the surface of the plane adjacent and perpendicular to the opening. This illuminated surface itself becomes a source of light and enhances the brightness of the space. The level of illumination can be enhanced further by turning the corner with the opening or adding a skylight above the opening.

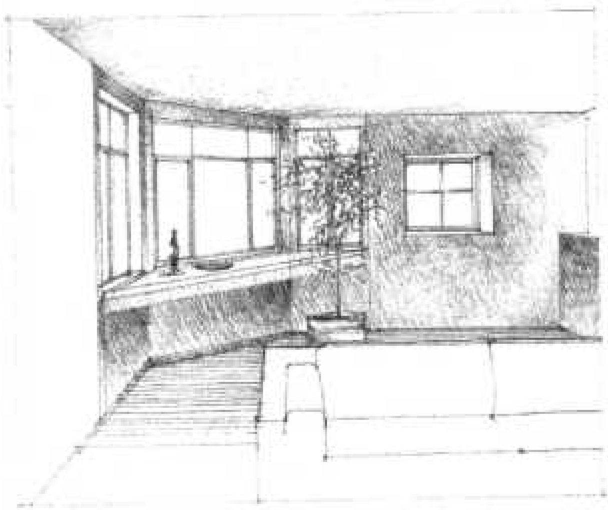
通过角部洞口进入空间的光线将照亮相邻和垂直于该洞口的表面。被照亮的面，本身变成了光源并提高了空间的亮度。可以通过转角式开洞或开洞上面增加天窗的方法，进一步提高照明度。

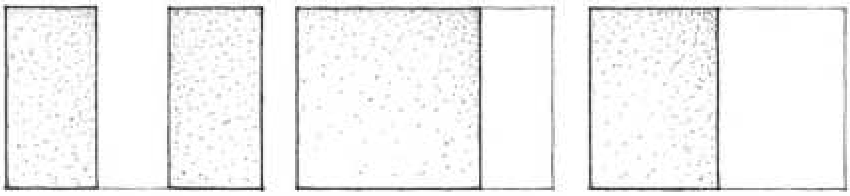




Studio, Amédée Ozenfant House, Paris, 1922–1923, Le Corbusier
画室，A. 奥占方住宅，巴黎，1922年—1923年，勒·柯布西埃

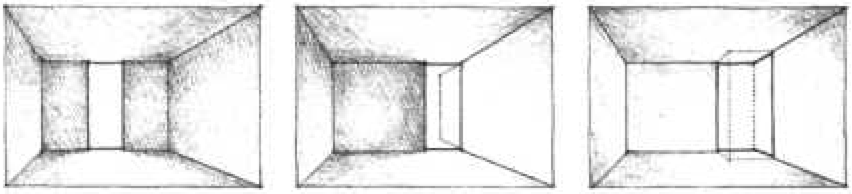






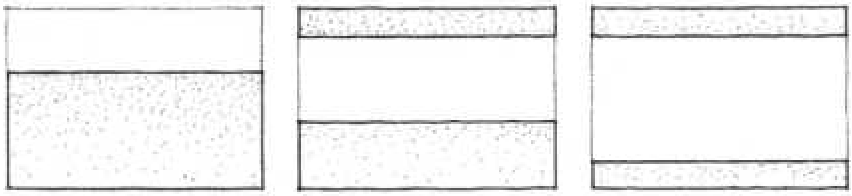
A vertical opening that extends from the floor to the ceiling plane of a space visually separates and articulates the edges of the adjacent wall planes.

一个空间中，从地面延伸至顶棚的竖向洞口，将在视觉上分隔和明确相邻墙面的边缘。



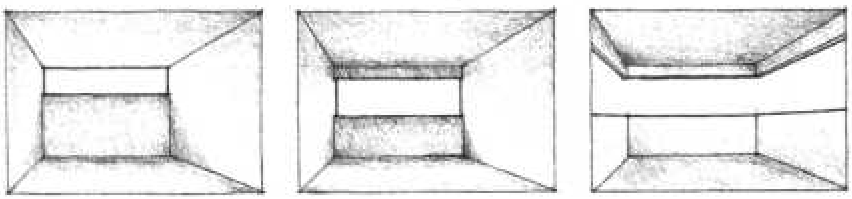
If located at a corner, the vertical opening will erode the definition of the space and allow it to extend beyond the corner to the adjacent space. It will also allow incoming light to wash the surface of the wall plane perpendicular to it and articulate the primacy of that plane in the space. If allowed to turn the corner, the vertical opening will further erode the definition of the space, allow it to interlock with adjacent spaces, and emphasize the individuality of the enclosing planes.

如果竖向的洞口位于空间的转角处，那么它将冲破空间的界限，使其超越转角，到达相邻的空间。竖向的洞口也会让入射光线掠过垂直于它的墙面，并明确这个面在空间中的首要地位。如果允许竖向洞口变为转角式，那么开洞将进一步冲破空间的限界，与相邻的空间彼此穿插，并强调围护面的独立性。



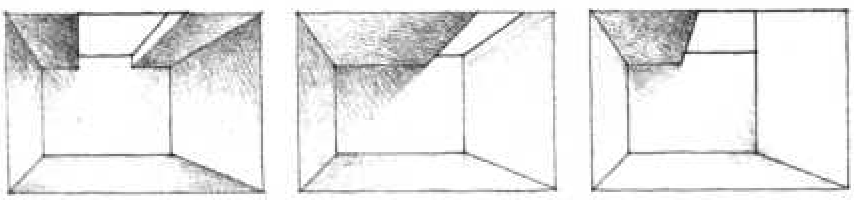
A horizontal opening that extends across a wall plane will separate it into a number of horizontal layers. If the opening is not very deep, it will not erode the integrity of the wall plane. If, however, its depth increases to the point where it is greater than the bands above and below it, then the opening will become a positive element bounded at its top and bottom by heavy frames.

横跨墙面的水平开洞将把墙面分成许多水平层。如果开洞尺寸不是很大，就不会破坏墙面的整体性。但是，如果它的高度增加，增加到比其上下两个地带都要宽的情况下，那么这个洞口将变成一个正要素，在它的上下由重框围住。



Turning a corner with a horizontal opening reinforces the horizontal layering of a space and broadens the panoramic view from within the space. If the opening continues around the space, it will visually lift the ceiling plane from the wall planes, isolate it, and give it a feeling of lightness.

一个转角变成水平洞口，将增强空间的水平层次，并为内部空间扩大全景视野。如果洞口连续环绕空间，将从视觉上使顶棚从墙面上升起，使之与墙面分离，并给顶棚一种轻快感。

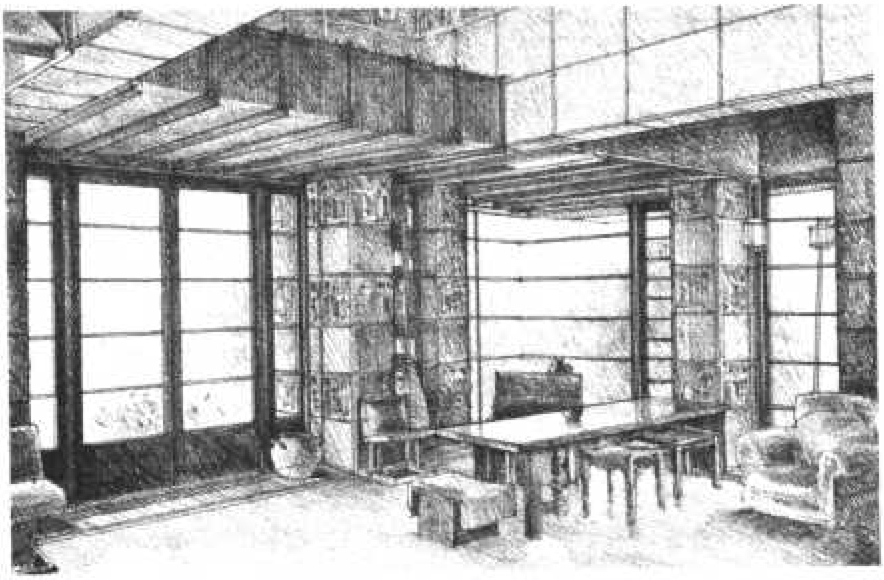


Locating a linear skylight along the edge where a wall and ceiling plane meet allows incoming light to wash the surface of the wall, illuminate it, and enhance the brightness of the space. The form of the skylight can be manipulated to capture direct sunlight, indirect daylight, or a combination of both.

沿着墙面和顶棚相交的边缘布置一个线式天窗，会使入射光线掠过墙面，照亮墙面，并提高空间的亮度。天窗的形式可以处理成捕获直射阳光、漫射光或二者兼而有之的形式。

Living Room, Samuel Freeman House,
Los Angeles, California, 1924, Frank Lloyd Wright

起居室、S. 弗里曼住宅，洛杉矶，加利福尼亚州，1924年，F. L. 莱特

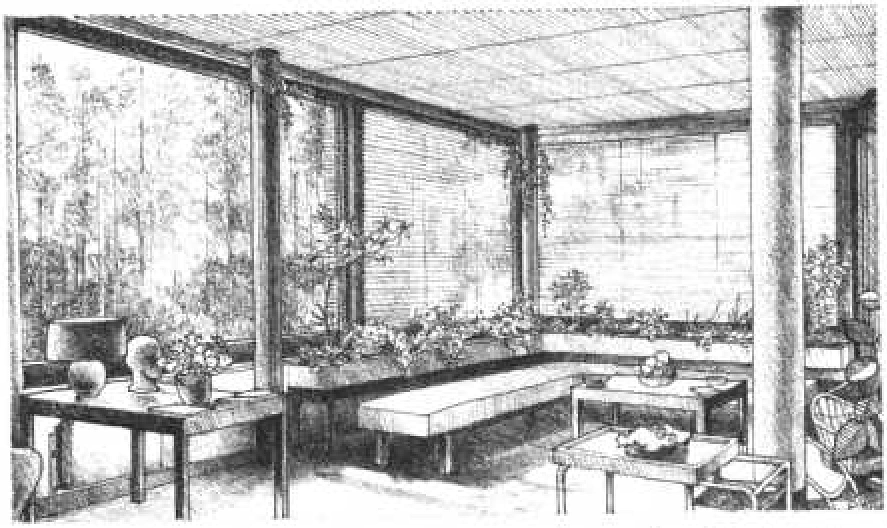


Window-walls offer more expansive views and permit a greater amount of daylight to penetrate a space than any of the previous examples of openings. If they are oriented to capture direct sunlight, sun-shading devices may be necessary to reduce glare and excessive heat gain within the space.

玻璃墙面提供了更广阔的视野。与前面讲到的开洞实例相比，玻璃墙面使更多的光线射入室内空间。如果它们的朝向是接受直射光，那就需要遮阳设施，以减少眩光和空间内过热。

While a window-wall weakens the vertical boundaries of a space, it creates the potential for visually expanding the space beyond its physical boundaries.

虽然玻璃墙面削弱了空间的垂直限界，但它造成了在视觉上扩展空间的潜力，使空间的感觉超出其实际的边界。



Living Room, Villa Mairea, Noormarkku, Finland, 1938–1939, Alvar Aalto

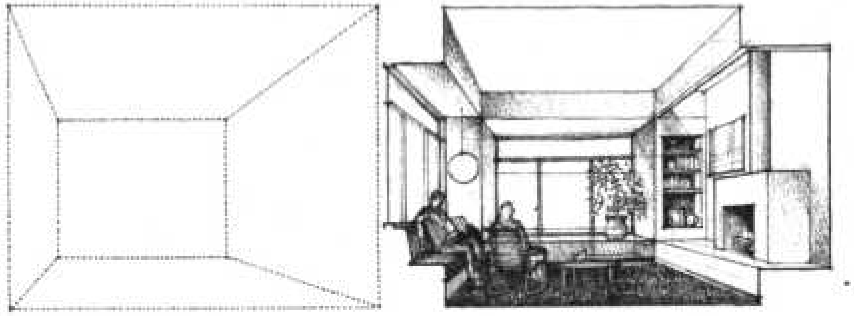
起居室，玛丽亚别墅，诺尔马库，芬兰，1938年—1939年，A. 阿尔托



Combining a window-wall with a large skylight overhead creates a sun room or greenhouse space. The boundaries between inside and outside, defined by the linear members of a frame, become obscure and tenuous.

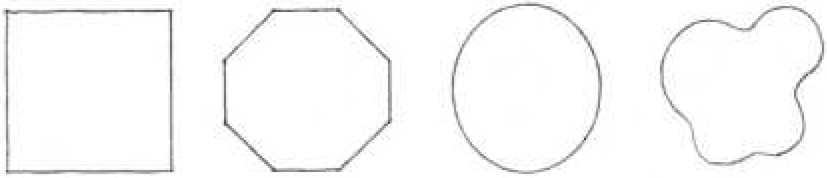
玻璃墙和顶部大型天窗结合起来，可形成阳光室或温室空间。由支撑构架的线式元素限定的室内与室外的界限，变得含混而模糊。

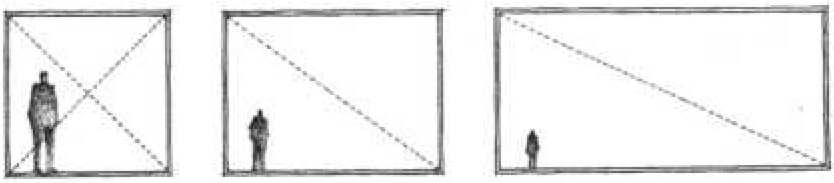
The basic patterns of linear and planar elements which define discrete volumes of space, and the varieties of openings that serve to connect these spatial volumes to one other and their context are presented on pages 156–57 and 159. The qualities of an architectural space, however, are much richer than what the diagrams are able to portray. The spatial qualities of form, proportion, scale, texture, light, and sound ultimately depend on the properties of the enclosure of a space. Our perception of these qualities is often a response to the combined effects of the properties encountered and is conditioned by culture, prior experiences, and personal interest or inclination.

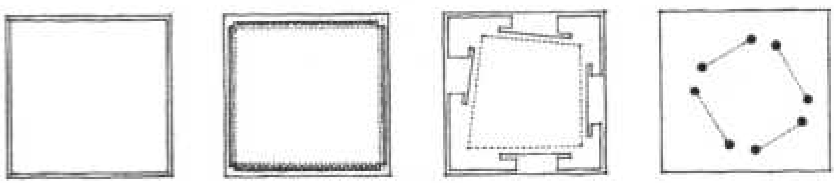


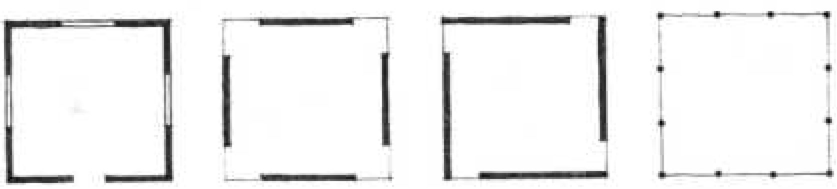
限定独立空间容积的线要素模式和面要素模式，以及用于连接这些空间容积及其背景的各种开洞方式，已经在第156、157和159页上作了介绍。然而建筑空间的特点，要比图表所列的东西丰富得多。形式、比例、尺度、质感、光和声等空间特点，最终决定于空间围护部分的属性。我们对于这些特点的感知，常常是对遇到的各种属性所产生的综合效果的反应，并取决于文化、经历以个人兴趣或个人爱好。

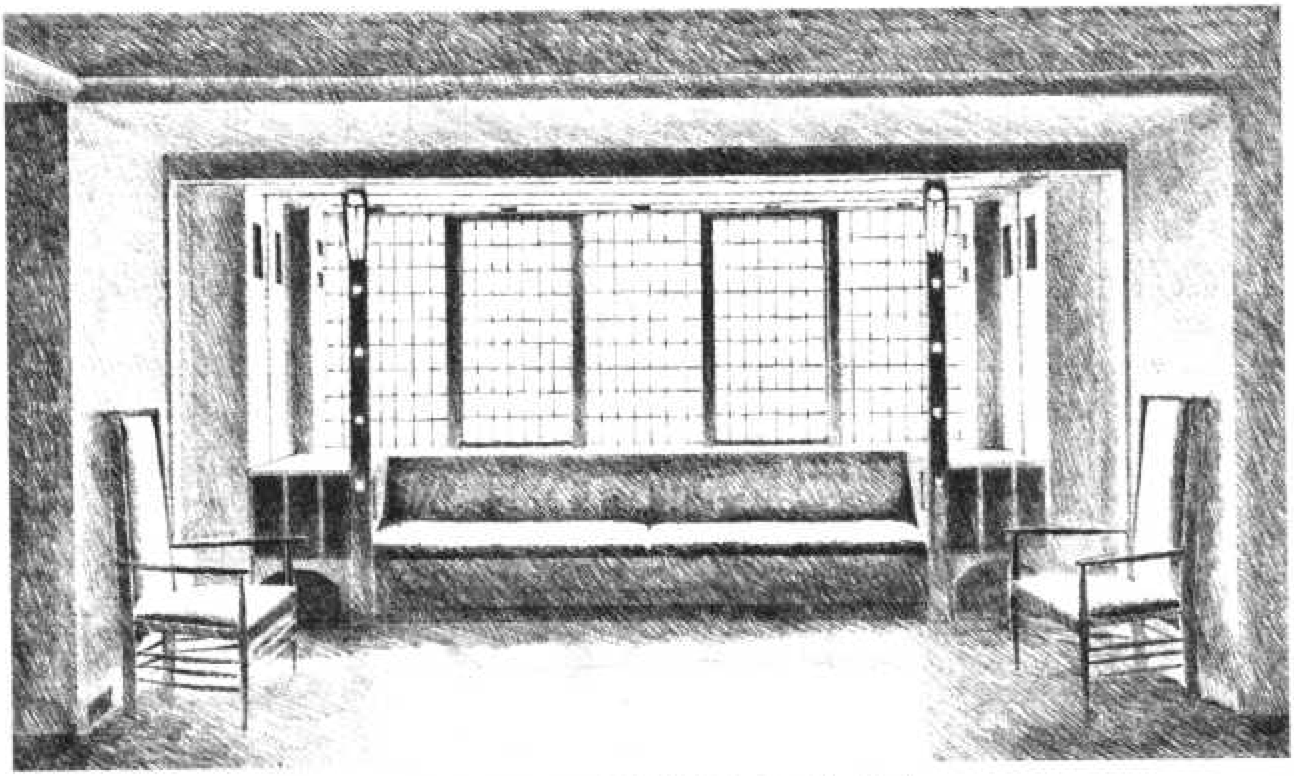
Properties of Enclosure 围护物的属性	Qualities of Space 空间的特性
• Shape · 形状	• Form · 形式
• Surface · 表面 • Edges · 边界	• Color · 色彩 • Texture · 质感 • Pattern · 图案 • Sound · 声音
• Dimensions · 量度	• Proportion · 比例 • Scale · 尺度
• Configuration · 造型	• Definition · 界限
• Openings · 洞口	• Degree of Enclosure • Light • View · 围合的程度 · 光 · 视野











Bay Window of the Living Room, Hill House, Helensburgh, Scotland, 1902–1903, Charles Rennie Mackintosh

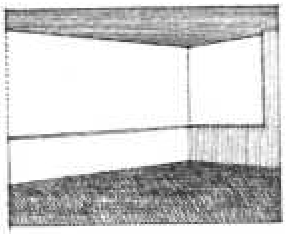
起居室的凸窗，西尔住宅，赫林斯巴勒，苏格兰，1902年—1903年，C. R. 麦金托什

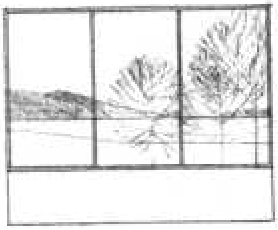
Chapter 2 discusses the impact of shape, surface, and edges on our perception of form. Chapter 6 presents the issues of dimensions, proportion, and scale. While the first part of this chapter outlines how basic configurations of linear and planar elements define volumes of space, this concluding section describes how the size, shape, and location of openings or voids within the enclosing forms of a space influence the following qualities of a room:

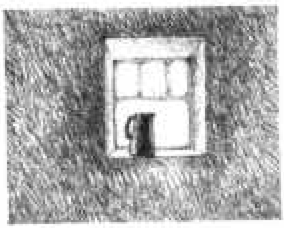
第2章讨论了形状、表面和边界对于我们感知形体的影响。第6章将介绍量度、比例和尺度问题。本章的第一部分概括了线式要素和平面要素所组成的基本造型是如何限定空间容积的，本章的结束部分则描述了位于空间围护形体上的洞口，其尺寸、形状和位置是如何影响一个房间的如下特征：

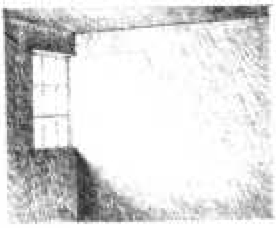
- **degree of enclosure** .... the form of the space
- **view** .... the focus of the space
- **light** .... the illumination of its surfaces and forms

- 围合程度 ………………空间的形式
- 景观 ……………………空间的焦点
- 光 ………………………其表面与形体的照度





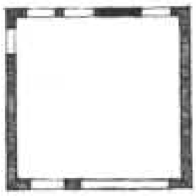


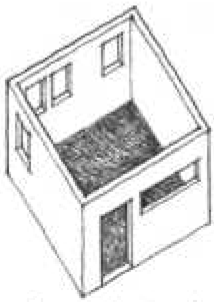


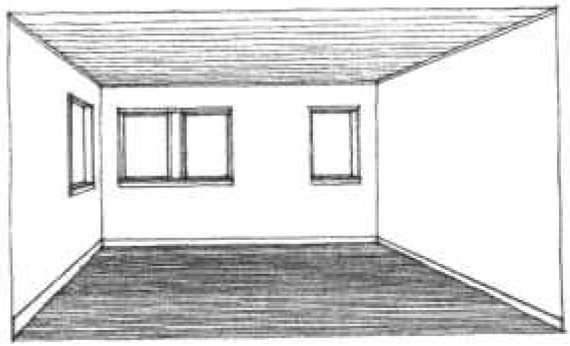
DEGREE OF ENCLOSURE

The degree of enclosure of a space, as determined by the configuration of its defining elements and the pattern of its openings, has a significant impact on our perception of its form and orientation. From within a space, we see only the surface of a wall. It is this thin layer of material that forms the vertical boundary of the space. The actual thickness of a wall plane can be revealed only along the edges of door and window openings.

空间围合的程度决定于其限定要素的造型和洞口的图案，对于我们感知其形体和方向具有重要影响。从空间内部观察，我们只能看到墙的表面。正是这一薄层材料形成了空间的垂直边界。墙面的实际厚度只能在门的边缘和窗洞处才能察觉到。

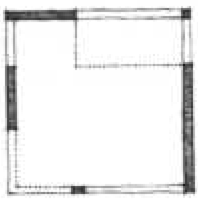


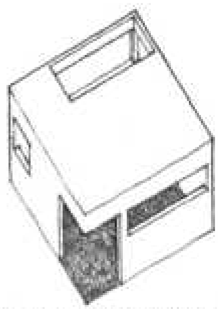


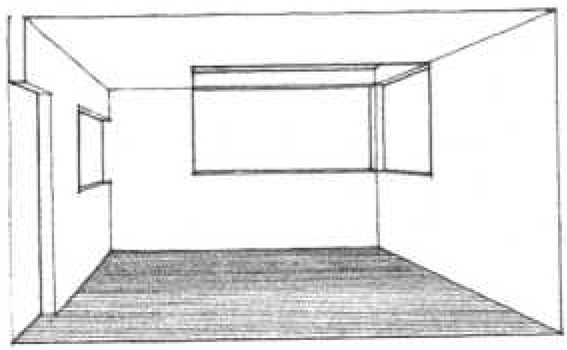


Openings lying wholly within the enclosing planes of a space do not weaken the edge definition nor the sense of closure of the space. The form of the space remains intact and perceptible.

洞口全部布置在空间的围护面以内，不削弱边缘的界限，也不削弱空间围合的感觉。空间的形式保持着完整性和可知性。

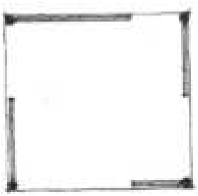


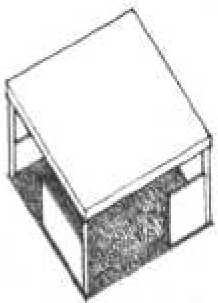


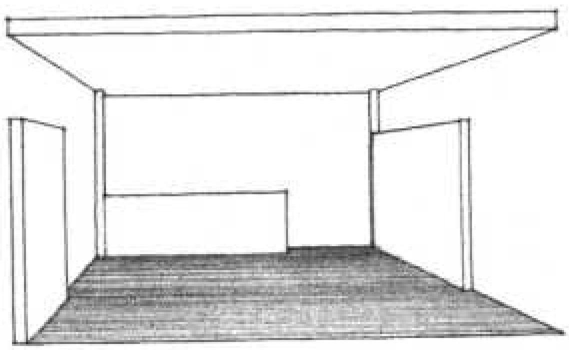


Openings located along the edges of the enclosing planes of a space visually weaken the corner boundaries of the volume. While these openings erode the overall form of a space, they also promote its visual continuity and interaction with adjacent spaces.

洞口开在空间围护面的边缘，将从视觉上削弱空间转角处的边界。虽然这些洞口会侵蚀空间的总体形式，但也会增进该空间与相邻空间的视觉连续性和相互的穿插关系。

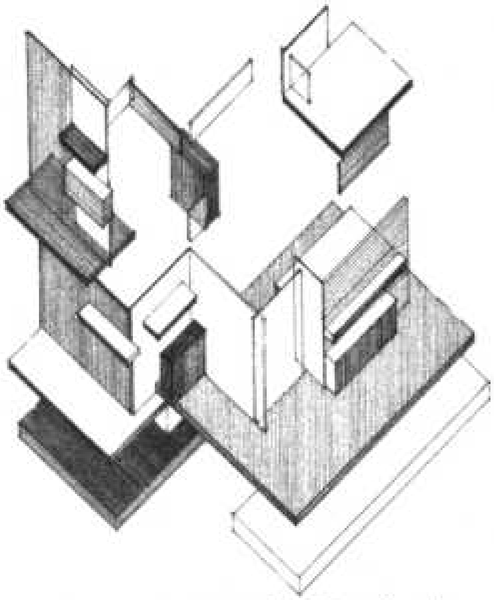


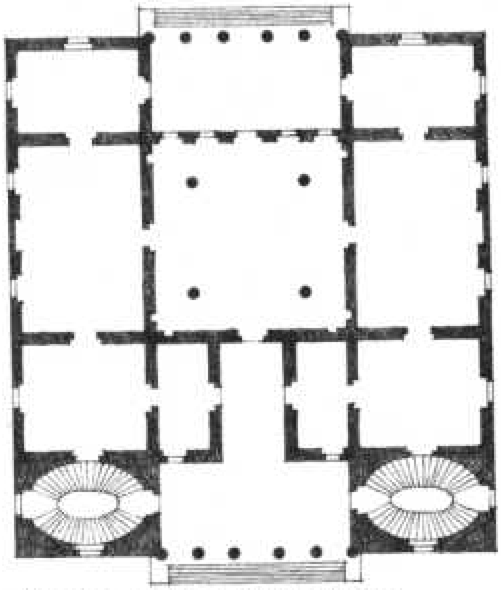




Openings between the enclosing planes of a space visually isolate the planes and articulate their individuality. As these openings increase in number and size, the space loses its sense of enclosure, becomes more diffuse, and begins to merge with adjacent spaces. The visual emphasis is on the enclosing planes rather than the volume of space defined by the planes.

空间围护面之间的洞口，从视觉上把这些面分离出来并明确了这些面的独立性。随着这些洞口的数量和尺寸逐渐增大，空间便失去了它的围合感，变得更加松散，并开始与相邻空间结合起来。视觉重点在于围护面，而不在于由面所限定的空间容积。



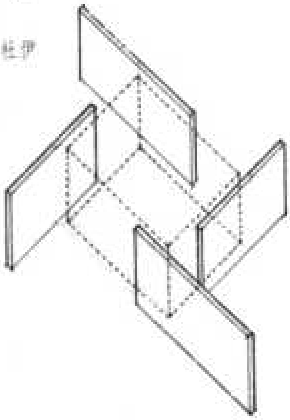


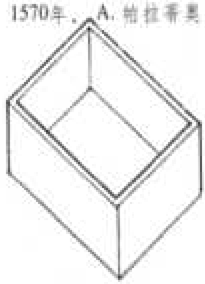
Color Construction (Project for a Private House), 1922, Theo van Doesburg and Cornels van Eesteren

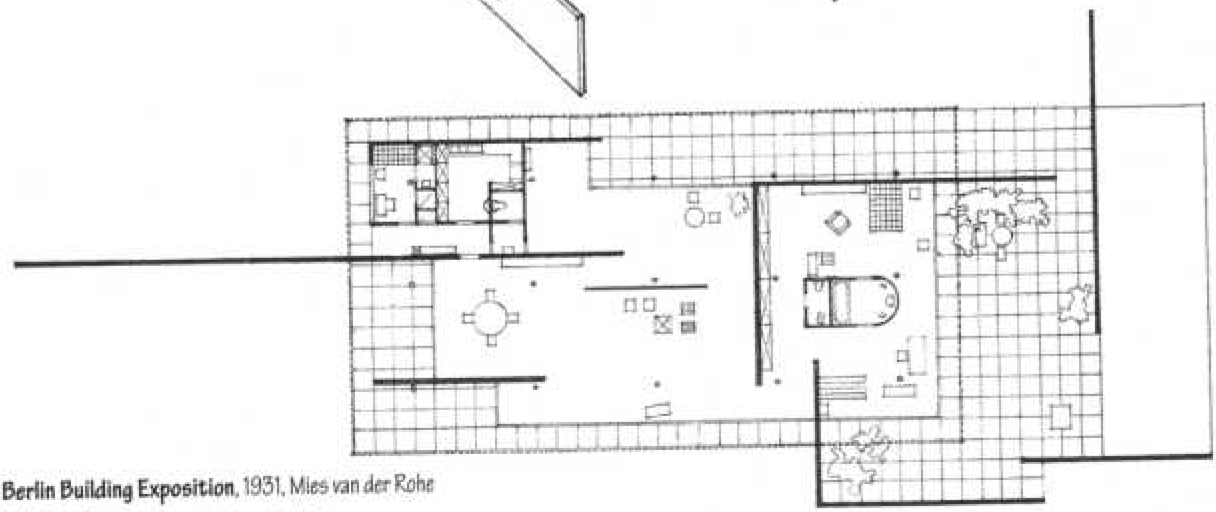
色彩构成（为私宅所做的方案），1922年，T. 凡杜伊斯堡和C. 凡埃斯特伦

Palazzo Garzadore (Project), Vincenza, Italy, 1570, Andrea Palladio

加尔扎多里府邸（方案），维琴察，意大利，1570年，A. 帕拉第奥





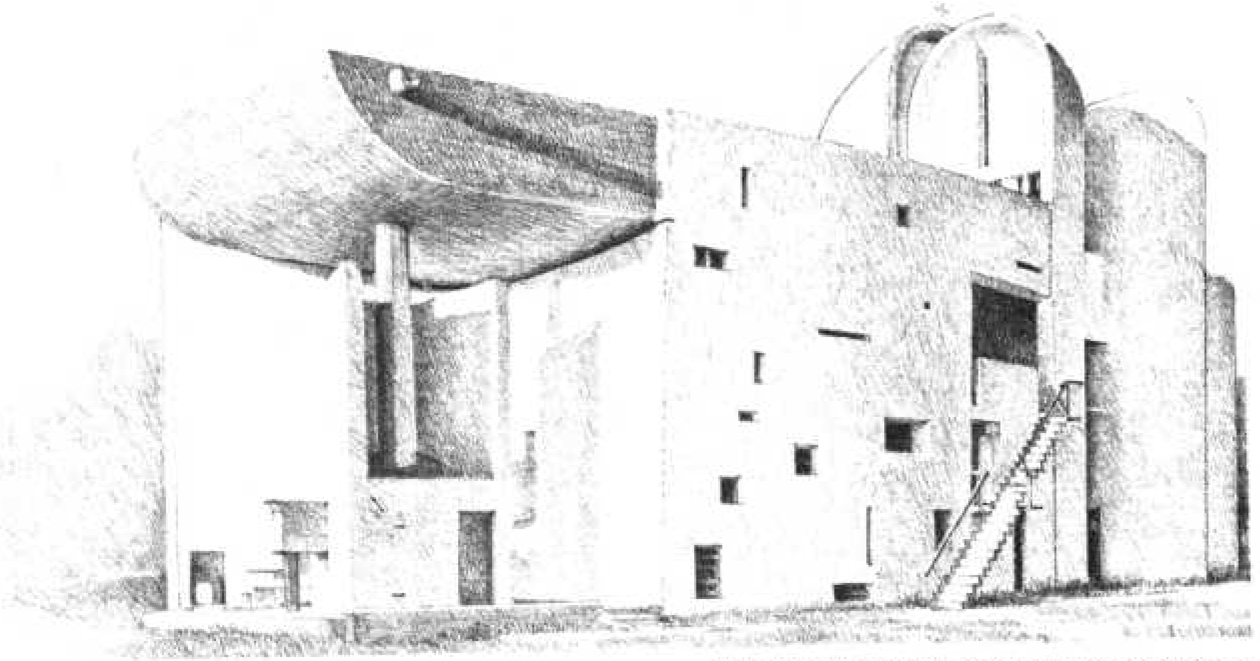


House, Berlin Building Exposition, 1931, Mies van der Rohe

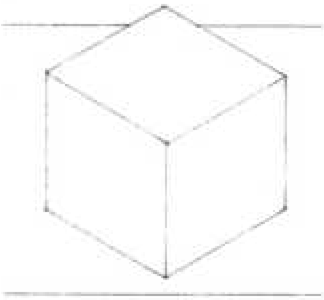
住宅，柏林建筑展，1931年，密斯·凡德罗

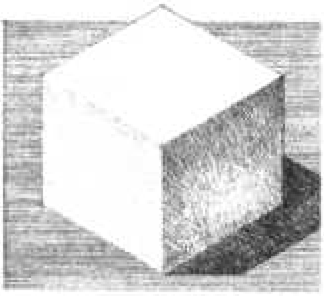
"Architecture is the masterly, correct and magnificent play of masses brought together in light. Our eyes are made to see forms in light; light and shade reveal these forms . . ."
Le Corbusier: *Towards a New Architecture*

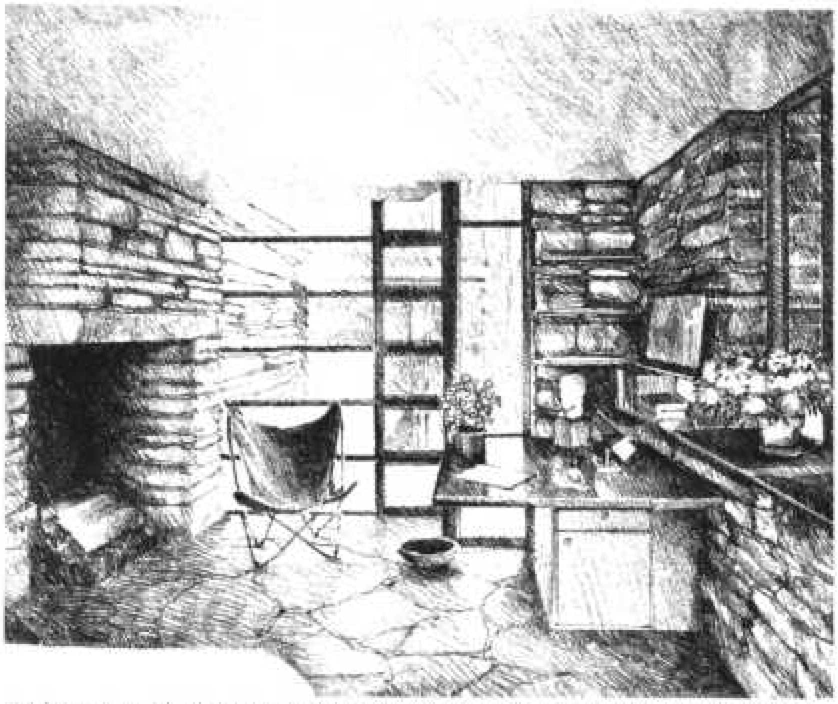
"建筑是集合在阳光下的体量所做的巧妙、恰当而卓越的表演。我们的眼睛生来就是为了观察光线中的形体；光与影展现了这些形体……"
勒·柯布西埃《走向新建筑》



Notre Dame Du Haut, Ronchamp, France, 1950–1955, Le Corbusier
圣母教堂，朗香，法国，1950年—1955年，勒·柯布西埃





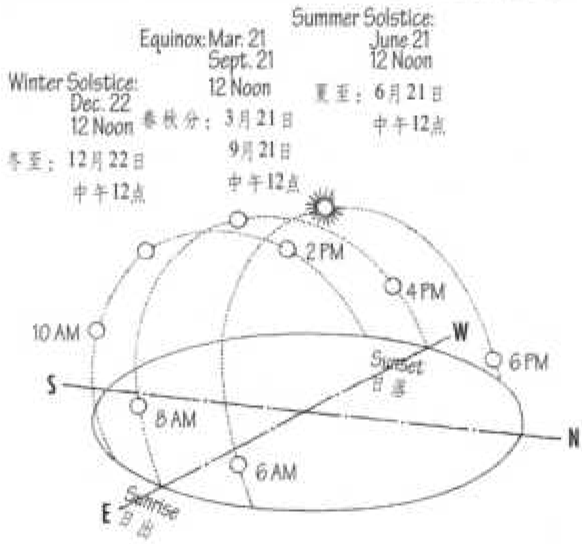


Kaufmann House (Falling Water), *Second-story Bedroom, Connellsville, Pennsylvania, 1936–1937,* Frank Lloyd Wright

考夫曼住宅（流水别墅），二层卧室，康奈尔斯维尔，宾夕法尼亚州，1936年—1937年，F. L. 莱特

The sun is the rich source of natural light for the illumination of forms and spaces in architecture. While the sun's radiation is intense, the quality of its light, manifested in the form of direct sunlight or diffuse daylight, varies with the time of day, from season to season, and from place to place. As the luminous energy of the sun is dispersed by clouds, haze, and precipitation, it transmits the changing colors of the sky and the weather to the forms and surfaces it illuminates.

太阳是自然光取之不尽的源泉，它照亮了建筑的形体和空间。虽然太阳光的照射很是强烈，但是其光线的特点表现为直射阳光和漫射日光，随着每天不同的时刻、每年不同的季节以及不同的地点而变化。太阳的光能量由于受到云、雾以及降水的影响而消散，因此，光把天空和季节中变化的色彩传送到它所照亮的形体与表面上。



Penetrating a space through windows in a wall plane, or through skylights in the overhead roof plane, the radiant energy of the sun falls upon the surfaces within the room, enlivens their colors, and reveals their textures. With the shifting patterns of light, shade, and shadows that it creates, the sun animates the space of the room, and articulates the forms within it. By its intensity and dispersion within the room, the luminous energy of the sun can clarify the form of the space or distort it. The color and brilliance of sunlight can create a festive atmosphere within the room or a more diffuse daylight can instill within it a somber mood.

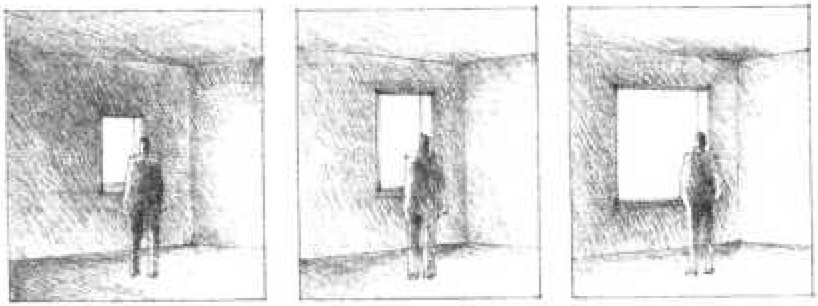
Since the intensity and direction of the light the sun radiates is fairly predictable, its visual impact on the surfaces, forms, and space of a room can be predicated on the size, location, and orientation of windows and skylights within the enclosure.

阳光透过墙面上的窗户或屋顶上的天窗射入空间，太阳的辐射能量落到房间内的各个表面上，使其色彩充满生机并表现出它们的质感。随着阳光带来的光线与阴影的变幻图案，阳光让室内空间活跃起来，并清楚地表达出室内空间的各种形体。由于阳光的强度和它在室内的扩散，太阳光能可以澄清空间中的形体或使其失真。阳光的色彩与光辉能够在室内营造出一种节日的气氛，或者，一种漫射的日光能够给室内空间灌注一种忧郁的情调。

由于太阳发出的光线强度是相当稳定的，其方向是可以预知的，因此其作用于室内表面、形体和空间的视觉效果，取决于围护物上窗户和天窗的大小、位置和方向。

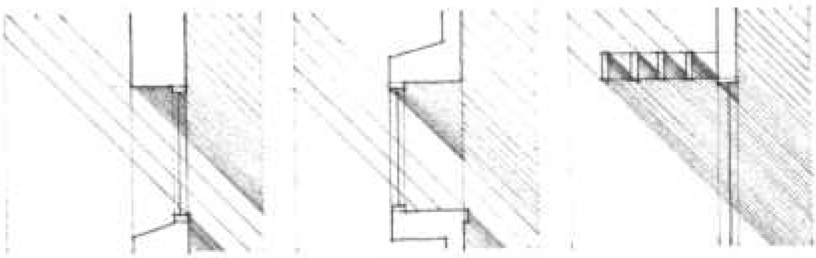
Sun-Path Diagram for the Northern Hemisphere

北半球太阳轨迹图



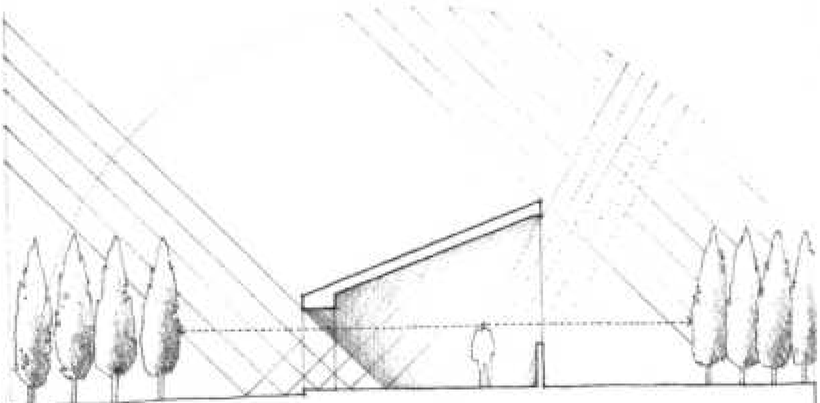
The size of a window or skylight controls the amount of daylight a room receives. The size of an opening in a wall or roof plane, however, is also regulated by factors other than light, such as the materials and construction of the wall or roof plane; requirements for views, visual privacy, and ventilation; the desired degree of enclosure for the space; and the effect of openings on the exterior form of a building. The location and orientation of a window or skylight, therefore, can be more important than its size in determining the quality of daylight a room receives.

窗户或天窗的尺寸控制着一个房间的总受光量。然而，墙面或屋面上洞口的尺寸也受控于很多因素，除了光线外，还有墙面或屋面的材料和结构，对于景观、视觉私密性以及通风的需求，想要得到的空间围合程度，建筑外部形式的开洞效果。因此，窗户或天窗的位置与方向在决定一个房间的受光性质方面，可能比其尺寸更加重要。



An opening can be oriented to receive direct sunlight during certain portions of the day. Direct sunlight provides a high degree of illumination that is especially intense during midday hours. It creates sharp patterns of light and dark on the surfaces of a room and crisply articulates the forms within the space. Possible detrimental effects of direct sunlight, such as glare and excessive heat gain, can be controlled by shading devices built into the form of the opening or provided by the foliage of nearby trees or adjacent structures.

洞口可以朝着一天当中某些时候能够接受直射光线的方向。直射光线提供了很高的照度，中午时段尤其强烈。直射光在室内的表面会造成非常强烈的光影图案，极为生动地表达空间中的各种形体。直射光可能引起的负面效果，如眩光、过热，可以用装在洞口形式之中的遮阳设施加以控制，或者利用附近树木的树叶或相邻建筑提供的阴影来遮阳。

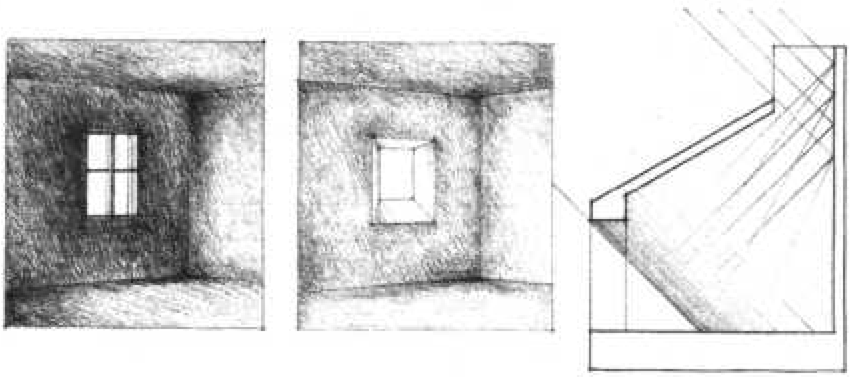


An opening can also be oriented away from direct sunlight and receive instead the diffuse, ambient light from the sky vault overhead. The sky vault is a beneficial source of daylight since it remains fairly constant, even on cloudy days, and can help to soften the harshness of direct sunlight and balance the light level within a space.

洞口的方向也可以避开直射光线，从头顶上的天穹接受漫射光和环境反射光。天穹是一个非常有益的日光源，因为它相当稳定，即使阴天也是如此。它有助于缓和刺目的直射光，并且在一个空间中平衡光照水平。

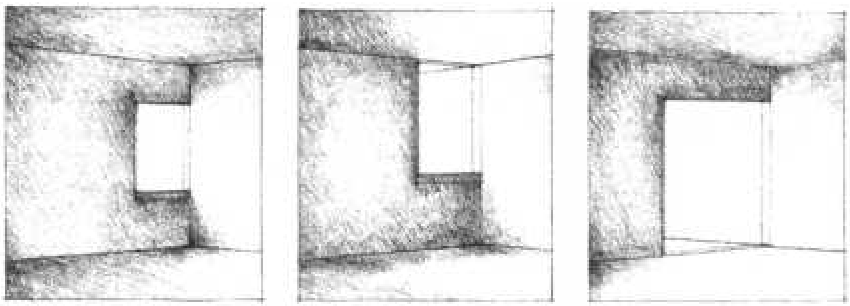
The location of an opening affects the manner in which natural light enters a room and illuminates its forms and surfaces. When located entirely within a wall plane, an opening can appear as a bright spot of light on a darker surface. This condition can induce glare if an excessive degree of contrast exists between the brightness of the opening and the darker surface surrounding it. The uncomfortable or debilitating glare caused by excessive brightness ratios between adjacent surfaces or areas in a room can be ameliorated by allowing daylight to enter the space from at least two directions.

洞口的位置影响着自然光进入房间以及照亮其中形体与表面的方式。当整个洞口位于墙面之中时，洞口将在较暗的墙面上呈现为一个亮点。如果洞口亮度与周围暗面对比度过于强烈，就会引起眩目的光线。这种令人不快或使人疲劳的眩光是由房间内相邻表面或相邻区域之间过度的亮度比所引起的。可以把日光从至少两个方向引入室内空间，这样能够避免眩光。



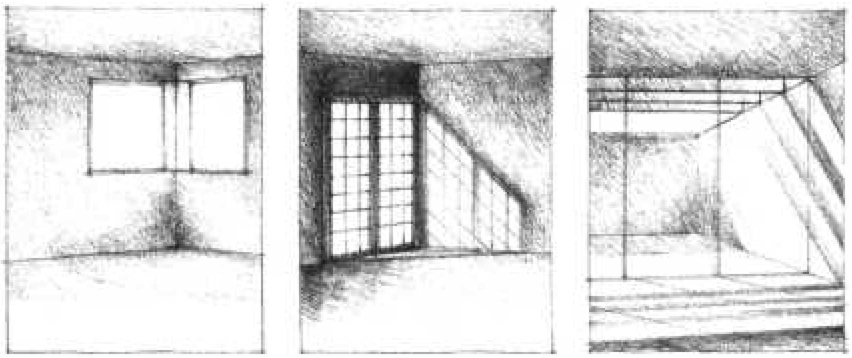
When an opening is located along the edge of a wall or at the corner of a room, the daylight entering through it will wash the surface of the wall adjacent and perpendicular to the plane of the opening. This illuminated surface itself becomes a source of light and enhances the light level within the space.

当一个洞口位于墙边或布置在一个房间的转角时，通过洞口进入的日光将照亮相邻的和垂直于开洞的面。被照亮的表面本身将变成一个光源，并将提高室内空间的亮度。



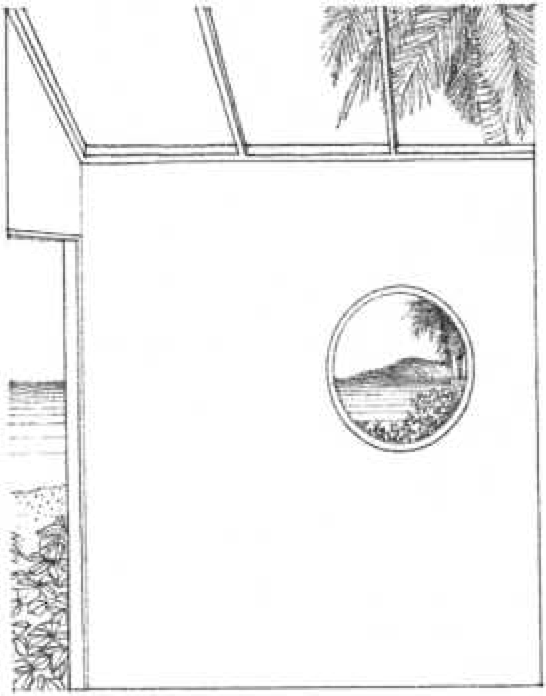
Additional factors influence the quality of light within a room. The shape and articulation of an opening is reflected in the shadow pattern cast by sunlight on the forms and surfaces of the room. The color and texture of these forms and surfaces, in turn, affect their reflectivity and the ambient light level within the space.

其他的要素也可以影响室内光线的质量。开洞的形状与清晰度反映在阴影的图案中，这些图案是阳光投射到室内形体和表面上的。因此，这些形体与表面的色彩和质感会影响到它们的反射性和空间中周围光照的水平。



Another quality of space that must be considered in establishing openings in the enclosure of a room is its focus and orientation. While some rooms have an internal focus, such as a fireplace, others have an outward orientation given to them by a view to the outdoors or an adjacent space. Window and skylight openings provide this view and establish a visual relationship between a room and its surroundings. The size and location of these openings determine, of course, the nature of the outlook as well as the degree of visual privacy for an interior space.

在房间的围护面上开洞必须考虑另一种空间性质，就是它的焦点与朝向。虽然一些房间有壁炉那样的内向焦点，而另外一些房间则具有外向性，那是由于这些房间的室外空间或邻近空间被赋予了一种景观。窗户和天窗洞口提供了这一景观，并在室内及其环境之间建立起一种视觉联系。当然，这些洞口的尺寸与位置决定了景观的特征，以及室内空间所具有的视觉私密性的程度。

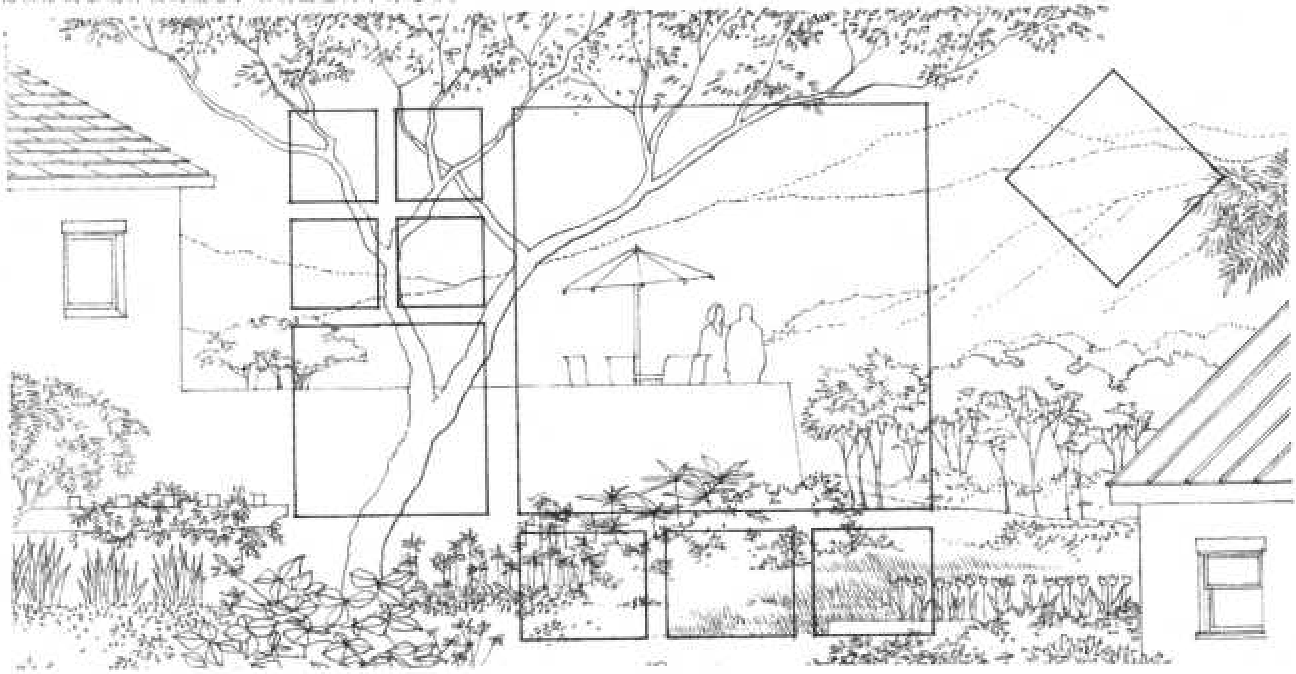


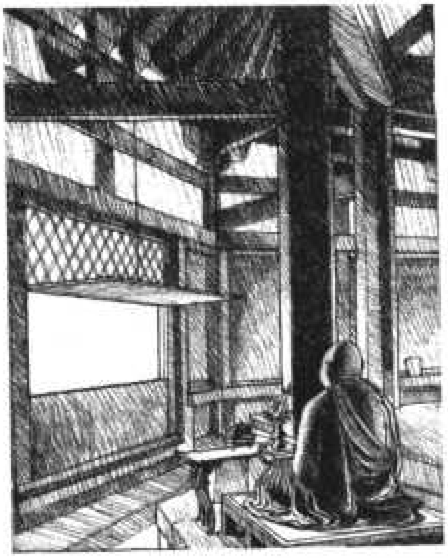
A small opening tends to frame a view so that we see it as a painting on a wall. A long, narrow opening gives only a hint of what lies beyond the room. A large opening opens a room up to a broad vista. The large scene can dominate a space or serve as a backdrop for the activities within it. A large bay window projects a person into a scene.

一个小型的开洞往往形成景框，因此我们把它看成墙上的一幅画。一个细长的开洞，只能给出室外景观的暗示。一个大型的洞口可以敞开一个房间，直至展示出一幅宽阔的景致。大型场景可以支配空间，或者作为内部空间活动的背景。一个大型的凸窗，可以使人融于风景之中。

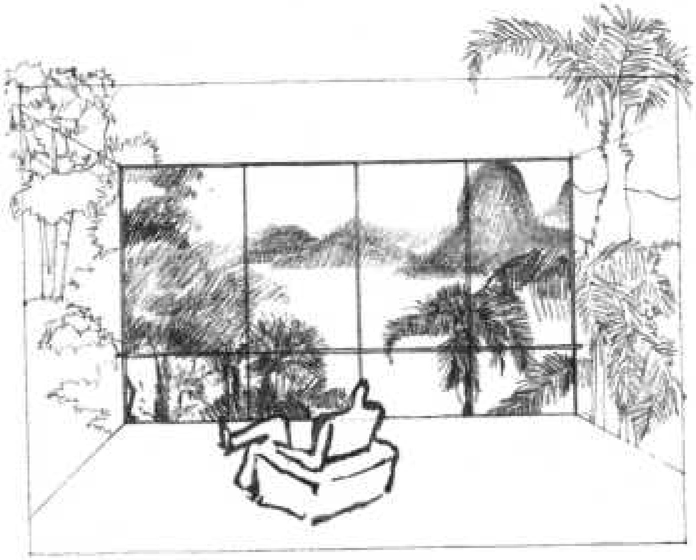
A window can be located in the corner of a room to give the space a diagonal orientation. It can be located in such a way that a view can be seen from only one position in the room. It can be oriented upward to offer a view of treetops and the sky. A group of windows can be sequenced to fragment a scene and encourage movement within a space.

窗可以布置在房间的转角，从而使空间具有对角线的方位感。窗也可以摆在这样一种位置上，即房间里只有这个位置能够看到景观。窗可以朝上，观看树冠和天空的景观。一组窗户可以被序列化以形成景观片段的集合，以刺激空间中的运动。

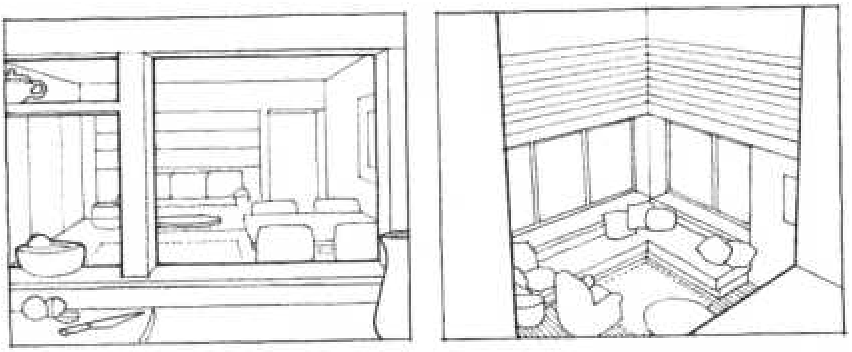




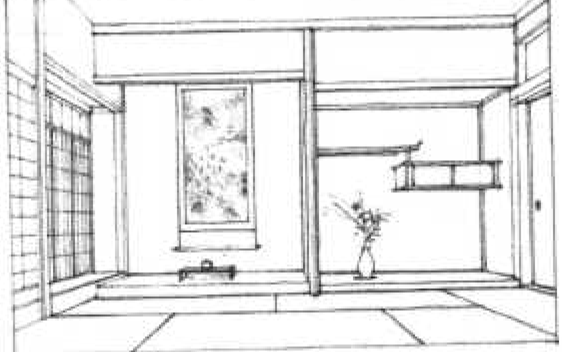
Interior of Horyu-Ji Temple, Nara, Japan, A.D. 607
法隆寺室内，奈良，日本，607年



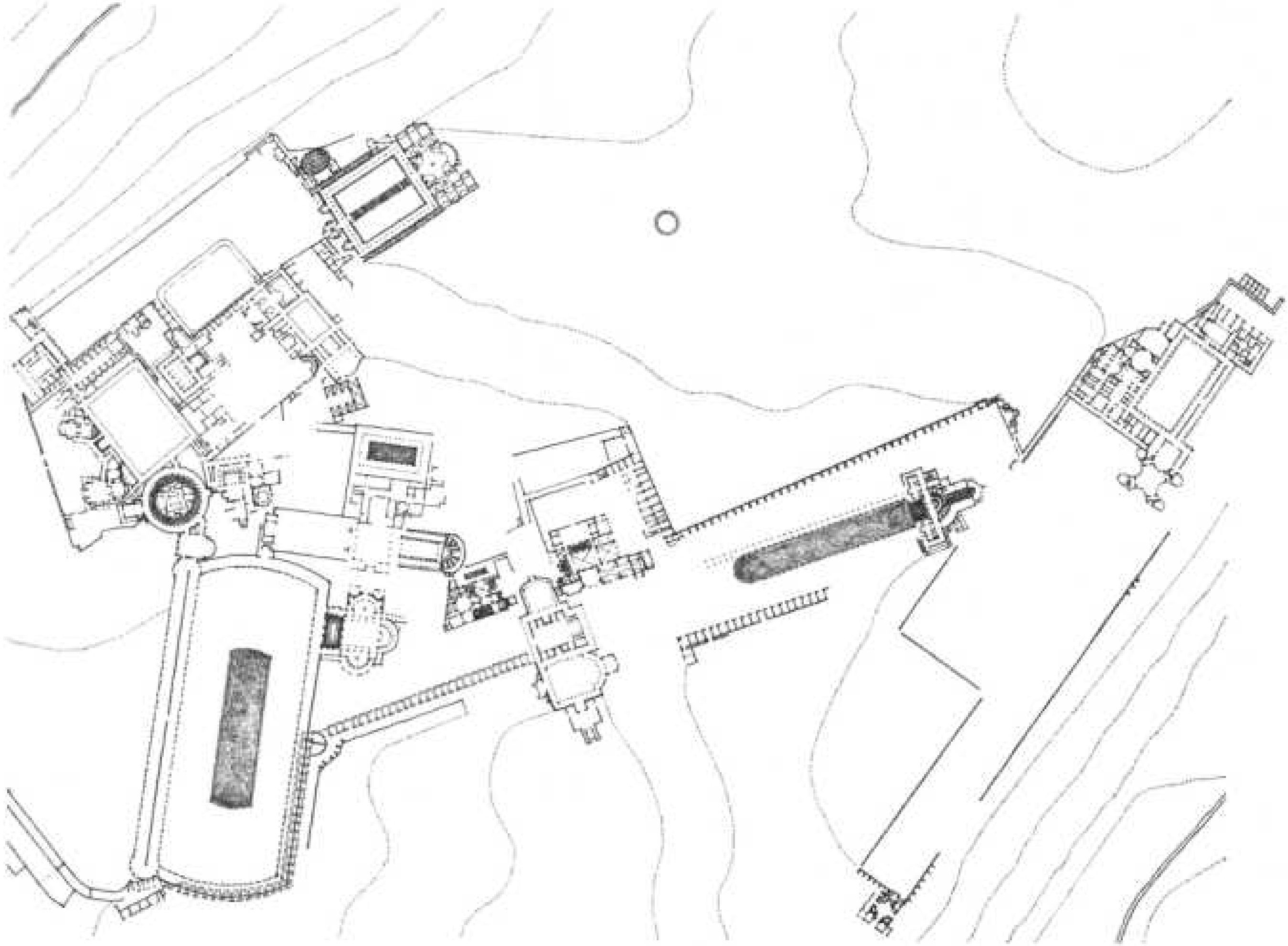
Vista, based on a sketch by Le Corbusier for the design of the Ministry of National Education and Public Health in Rio de Janeiro, 1936
展望，根据勒·柯布西埃画的草图，在里约热内卢为国家教育与公共卫生部所做的设计，1936年



Interior openings providing views from one space to another.
室内的洞口提供了从一个空间到另一空间的视野。



Tokonoma, an internal focus in a Traditional Japanese House
画室，传统日本住宅中的室内焦点



Hadrian's Villa, Tivoli, Italy, A.D. 118–125

哈德良别墅，提沃利，意大利，118年—125年

4 组合
Organization

"... A good house is a single thing, as well as a collection of many, and to make it requires a conceptual leap from the individual components to a vision of the whole. The choices ... represent ways of assembling the parts.
... the basic parts of a house can be put together to make more than just basic parts: They can also make space, pattern, and outside domains. They dramatize the most elementary act which architecture has to perform. To make one plus one equal more than two, you must in doing any one thing you think important (making rooms, putting them together, or fitting them to the land) do something else that you think important as well (make spaces to live, establish a meaningful pattern inside, or claim other realms outside)."

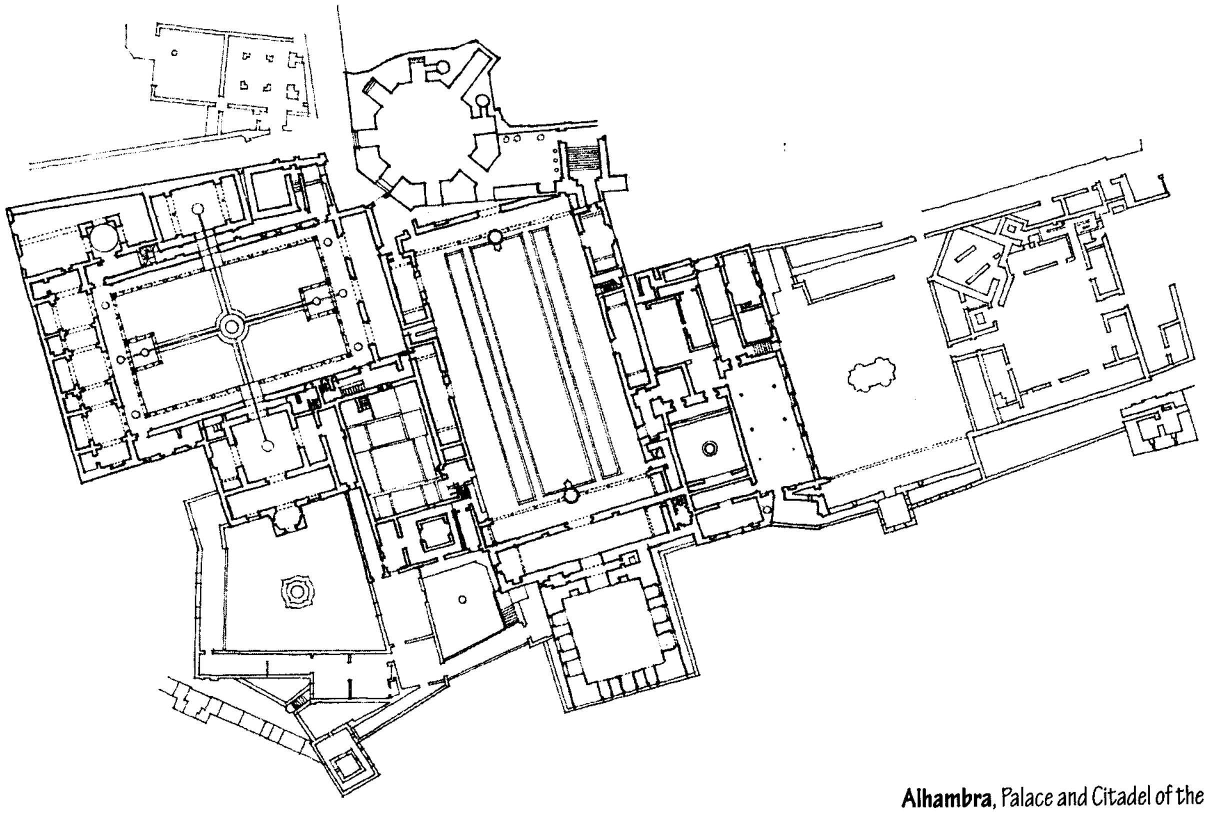
Charles Moore, Gerald Allen, Donlyn Lyndon
The Place of Houses
1974

"一座好房子是一件完整的事物，也是许多内容的集合。造一座好房子需要一种观念的飞跃，即从单独构件到整体形象的飞跃。这些选择……体现了组装各个部件的方式。
"……一座房子的基本部件可以被组合在一起，而其结果却不仅是基本部件的组合：它们还能够形成空间、图案以及外部领地。它们戏剧性地编排建筑必须上演的最基本的'剧目'。为了使1+1的结果超过2，你必须履行任何一件你认为重要的事情（制造房间，把房间组合在一起，或者使这些房间与地形相适应），你还必须做你认为同样重要的另外一些事情（使空间适宜居住，形成含义丰富的室内图案或者控制其他的外部领域）。"

C. 穆尔、G. 艾伦、D. 林登
《房屋的场所》
1974年

The last chapter laid out how various configurations of form could be manipulated to define a solitary field or volume of space, and how their patterns of solids and voids affected the visual qualities of the defined space. Few buildings, however, consist of a solitary space. They are normally composed of a number of spaces which are related to one another by function, proximity, or a path of movement. This chapter lays out for study and discussion the basic ways the spaces of a building can be related to one another and organized into coherent patterns of form and space.

上一章我们讨论了如何处理各种不同的造型，以限定单一的空间范围或空间容积，并且讨论了这些实体和空间的图案是如何影响所限定空间的视觉性质的。然而，由单一空间构成的建筑物寥寥无几，一般的建筑物总是由许多空间组成的，按照这些空间的功能、相似性或运动轨迹，将它们相互联系起来。本章提出一些基本的方法，将一个建筑的各个空间彼此联系并组合成连贯的形式和空间的图案，以供大家研究讨论。



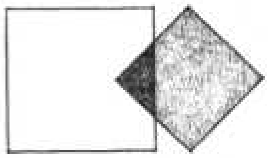
Alhambra, Palace and Citadel of the Moorish kings, Granada, Spain, 1248–1354

阿尔罕伯拉宫，摩尔王的宫殿和大本营，格拉纳达，西班牙，1248年—1354年

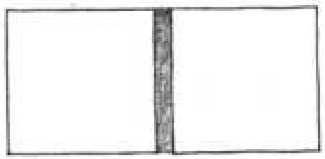
Space within a Space
空间内的空间



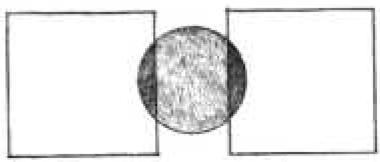
Interlocking Spaces
穿插式空间

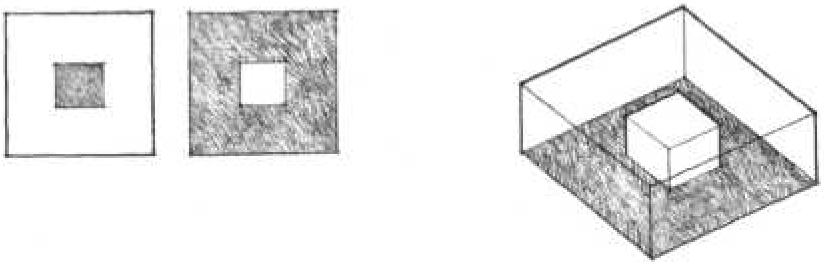


Adjacent Spaces
邻接式空间



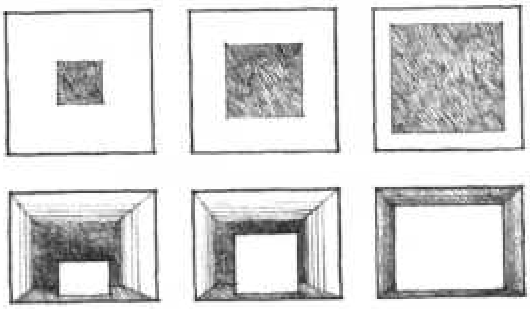
Spaces Linked by a Common Space
由公共空间连起的空间





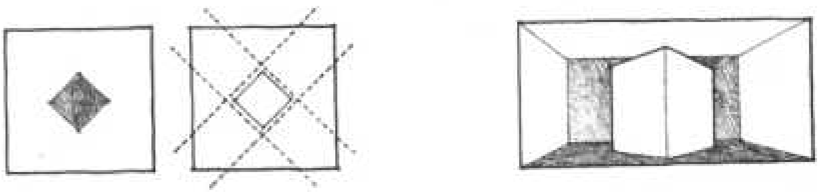
A large space can envelop and contain a smaller space within its volume. Visual and spatial continuity between the two spaces can be easily accommodated, but the smaller, contained space depends on the larger, enveloping space for its relationship to the exterior environment.

一个大空间可以在其容积之内包含一个小空间，两者之间很容易产生视觉及空间的连续性，但是被包含的小空间与室外环境的关系则取决于包在外面的大空间。



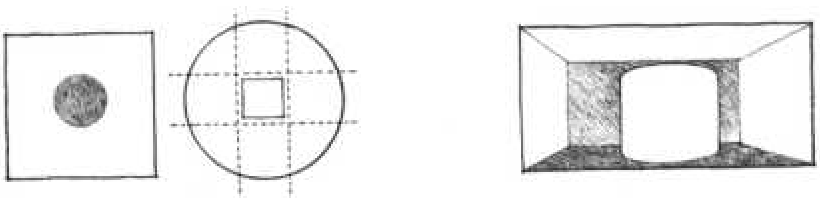
In this type of spatial relationship, the larger, enveloping space serves as a three-dimensional field for the smaller space contained within it. For this concept to be perceived, a clear differentiation in size is necessary between the two spaces. If the contained space were to increase in size, the larger space would begin to lose its impact as an enveloping form. If the contained space continued to grow, the residual space around it would become too compressed to serve as an enveloping space. It would become instead merely a thin layer or skin around the contained space. The original notion would be destroyed.

在这种空间关系中，封闭的大空间为包含于其中的小空间提供了一个三度的领域。为了感知这种概念，两者之间的尺寸必须有明显的差别。如果被包围的空间尺寸增大，那么大空间则开始失去作为包围形式的能力。如果被包围的空间继续增大，那么它周边的剩余空间将被大大压缩而不能称其为包围空间。外层空间将变成仅仅是环绕被围空间的一片薄层或一层表皮。那么，原来的意图就破坏殆尽了。



To endow itself with a higher attention-value, the contained space may share the form of the enveloping shape, but be oriented in a different manner. This would create a secondary grid and a set of dynamic, residual spaces within the larger space.

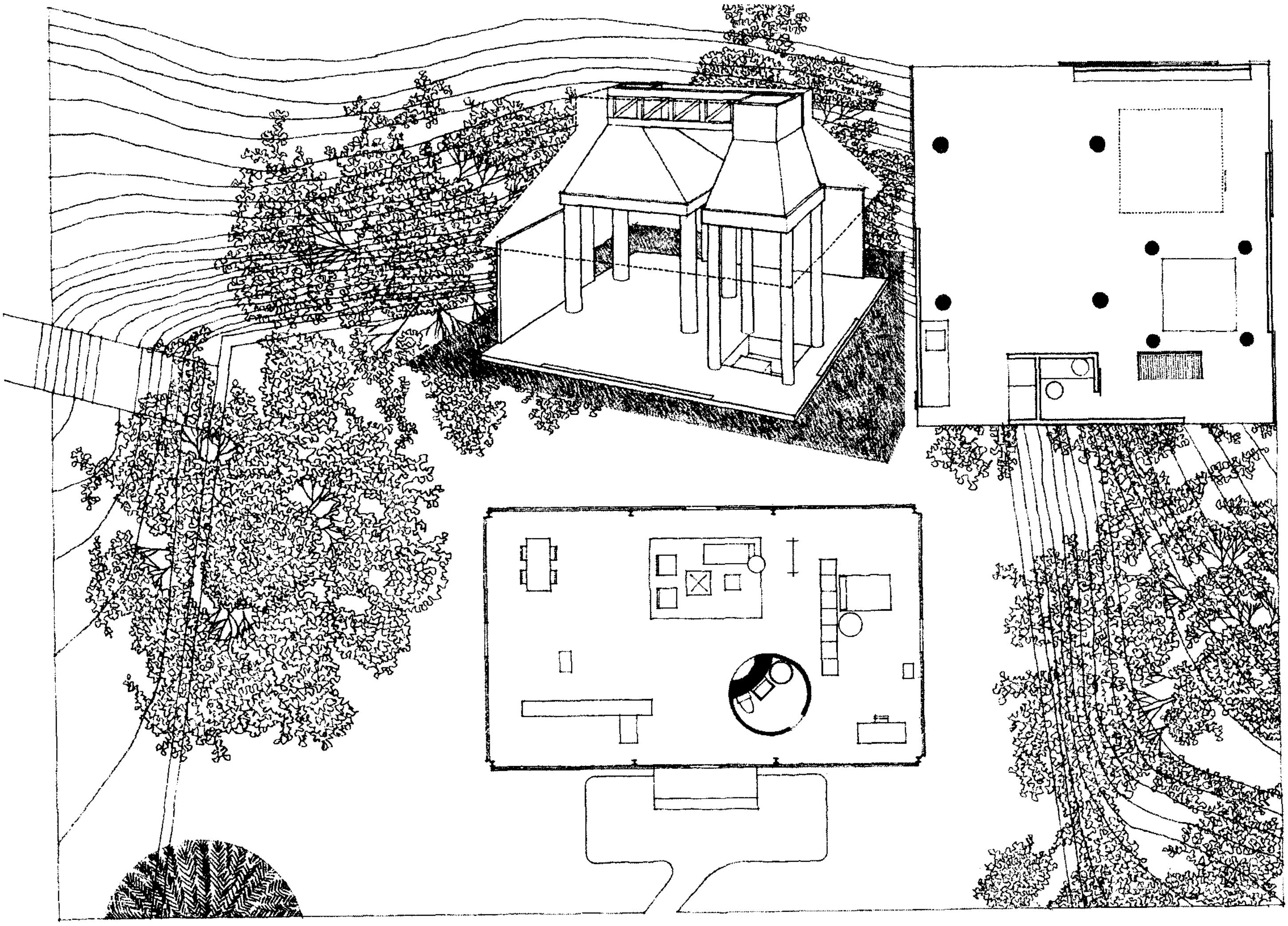
为了使被围空间具有较高的吸引力，其形式可以与外围空间的形状相同，但其方位则是不同的方式。这种作法会在大空间中产生二级网格和一系列充满动感的附属空间。



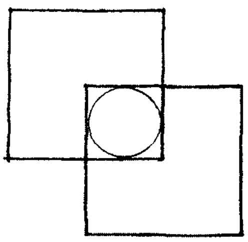
The contained space may also differ in form from the enveloping space in order to strengthen its image as a freestanding volume. This contrast in form may indicate a functional difference between the two spaces or the symbolic importance of the contained space.

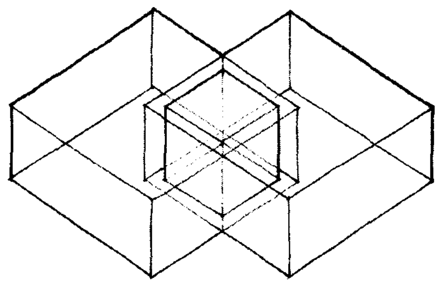
被围空间的形式也可以不同于围护空间，以增强其独立体量的形象。这种形体对比会表明两个空间的功能不同，或者被围空间具有重要的象征意义。

Moore House, Orinda, California, 1961, Charles Moore
穆尔住宅，奥瑞达，加利福尼亚州，1961年，C. 穆尔



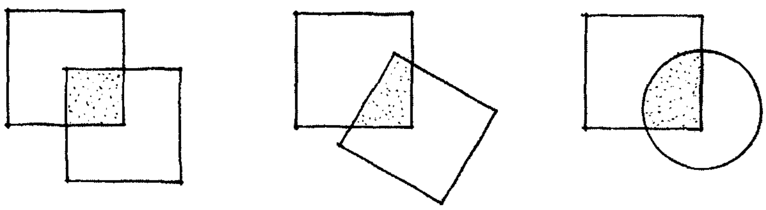
Glass House, New Canaan, Connecticut, 1949, Philip Johnson
玻璃住宅，新坎南，康涅狄格州，1949年，P. 约翰逊





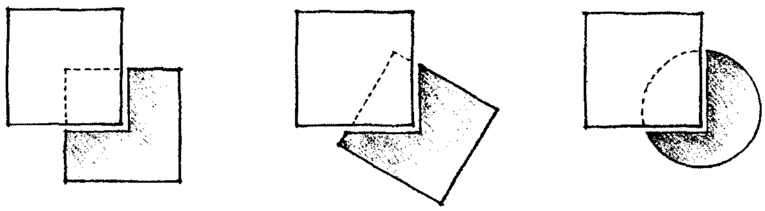
An interlocking spatial relationship results from the overlapping of two spatial fields and the emergence of a zone of shared space. When two spaces interlock their volumes in this manner, each retains its identity and definition as a space. But the resulting configuration of the two interlocking spaces is subject to a number of interpretations.

穿插式的空间关系来自两个空间领域的重叠，并且出现了一个共享的空间区域。当两个空间的容积以这种方式穿插时，每个容积仍保持着它作为一个空间的可识别性和界限。但是对于两个穿插空间的最后造型，则需要做一些说明。



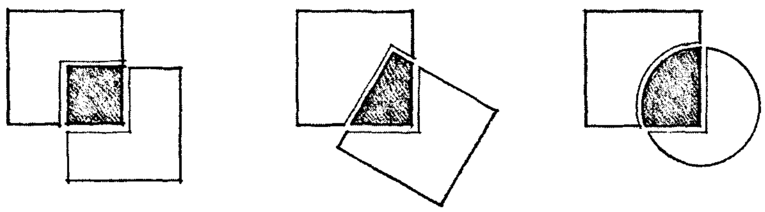
The interlocking portion of the two volumes can be shared equally by each space.

两个容积的穿插部分，可为各个空间同等共有。



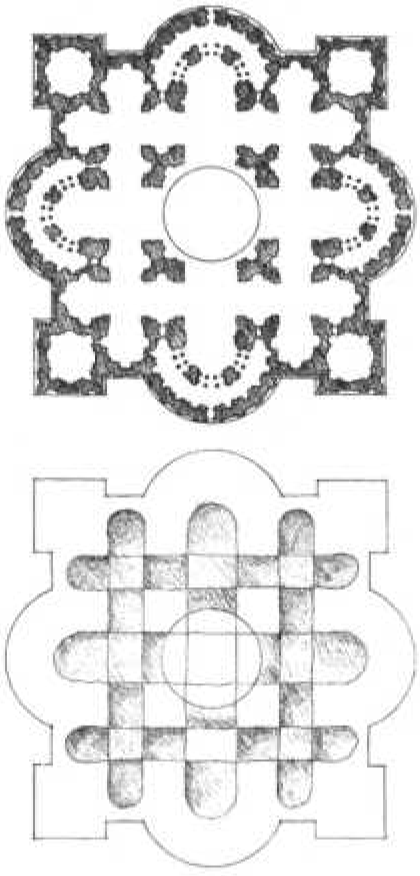
The interlocking portion can merge with one of the spaces and become an integral part of its volume.

穿插部分可以与其中一个空间合并，而成为其整个容积的一部分。

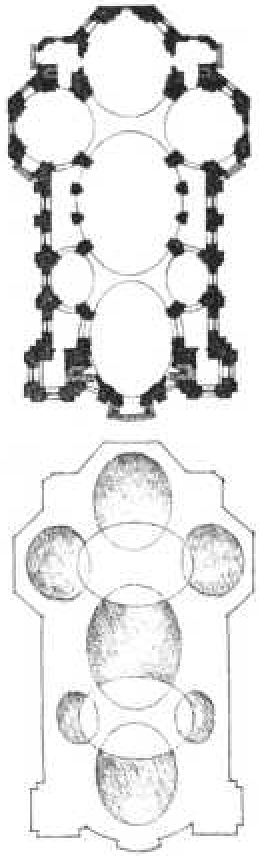


The interlocking portion can develop its own integrity as a space that serves to link the two original spaces.

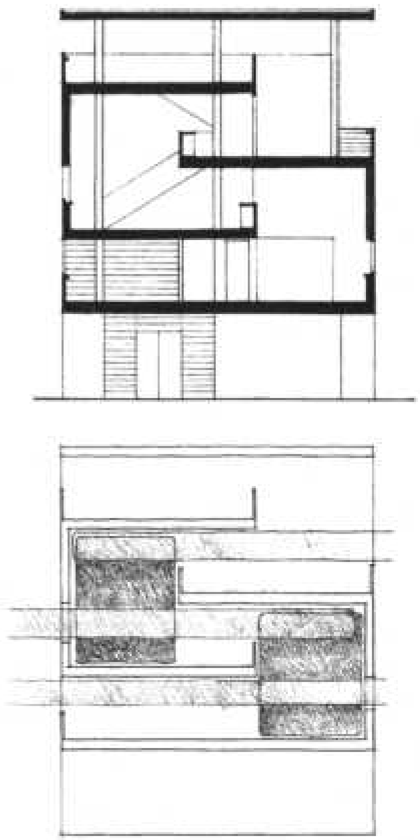
穿插部分可以作为一个空间自成一体，并用来连接原来的两个空间。



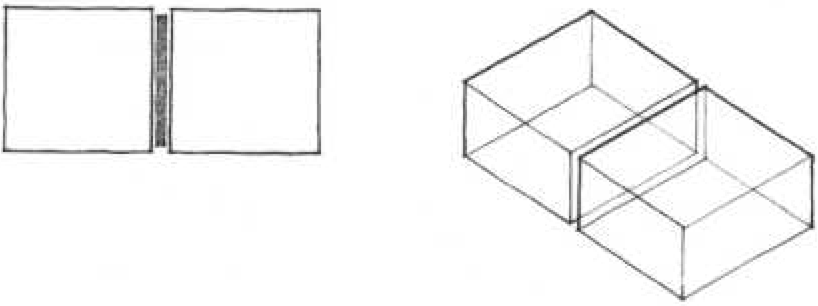
Plan for St. Peter (Second Version), Rome, 1506–1520, Donato Bramante & Baldassare Peruzzi
圣彼得大教堂平面（第二稿），罗马，1506年—1520年，D. 伯拉孟特与B. 伯鲁齐



Pilgrimage Church, Vierzehnheiligen, Germany, 1744–1772, Balthasar Neumann
朝圣教堂，威林赫里根，德国，1744年—1772年，B. 纽曼



Villa at Carthage, Tunisia, 1928, Le Corbusier
迦太基别墅，突尼斯，1928年，勒·柯布西埃

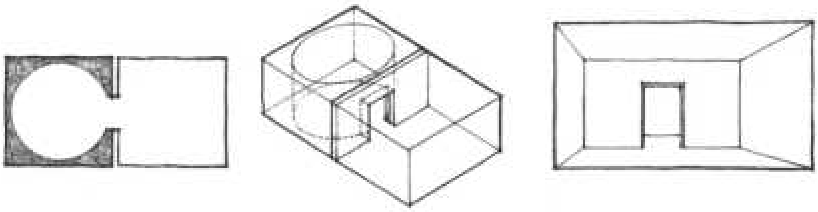


Adjacency is the most common type of spatial relationship. It allows each space to be clearly defined and to respond, each in its own way, to specific functional or symbolic requirements. The degree of visual and spatial continuity that occurs between two adjacent spaces depends on the nature of the plane that both separates and binds them together.

邻接是空间关系中最常见的形式。它让每个空间都能得到清楚地限定，并且以其自身的方式回应特殊的功能要求或象征意义。两个相邻空间之间，在视觉和空间上的连续程度取决于那个既将它们分开又把它们联系在一起的面的特点。

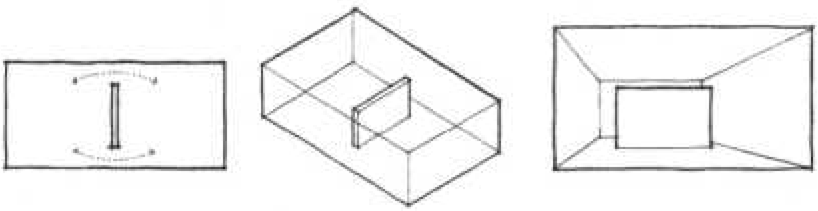
The separating plane may:

分隔面可以：



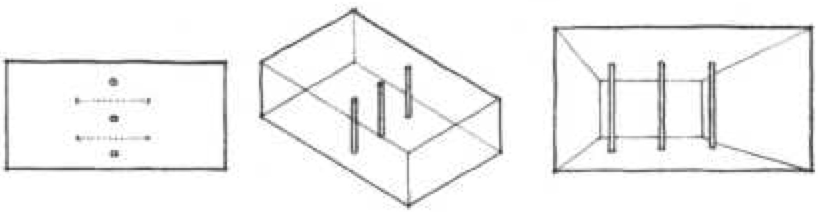
- limit visual and physical access between two adjacent spaces, reinforce the individuality of each space, and accommodate their differences.

  限制两个邻接空间的视觉连续和实体连续，增强每个空间的独立性，并调节二者的差异。



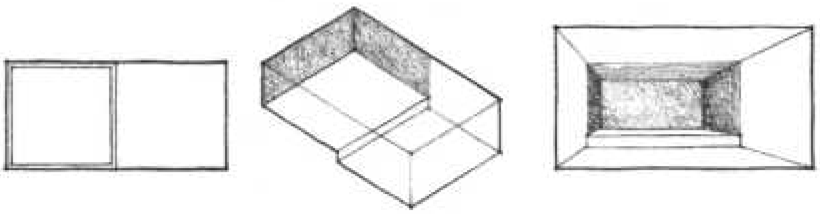
- appear as a freestanding plane in a single volume of space.

  作为一个独立面设置在单一空间容积中。



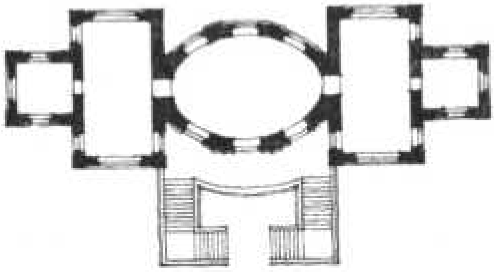
- be defined with a row of columns that allows a high degree of visual and spatial continuity between the two spaces.

  被表达为一排柱子，可使两空间之间具有高度的视觉连续性和空间连续性。



- be merely implied with a change in level or a contrast in surface material or texture between the two spaces. This and the preceding two cases can also be read as single volumes of space which are divided into two related zones.

  仅仅通过两个空间之间高程的变化或表面材料以及表面纹理的对比来暗示。此例以及前面的两例也可以被视为单一的空间容积，被分为两个相关的区域。

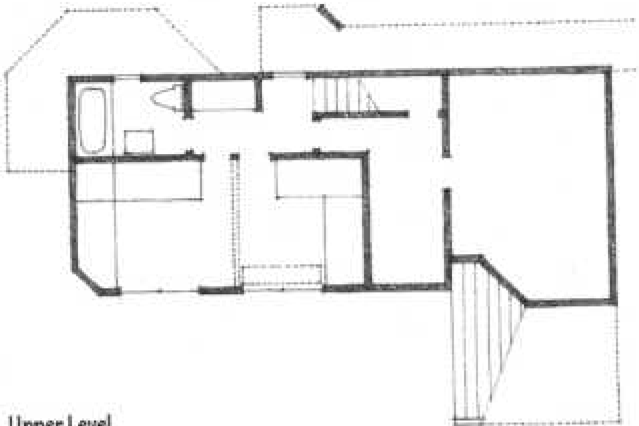


Pavilion Design, 17th century, Fischer von Erlach

亭阁设计，17世纪，F.冯·沃拉赫

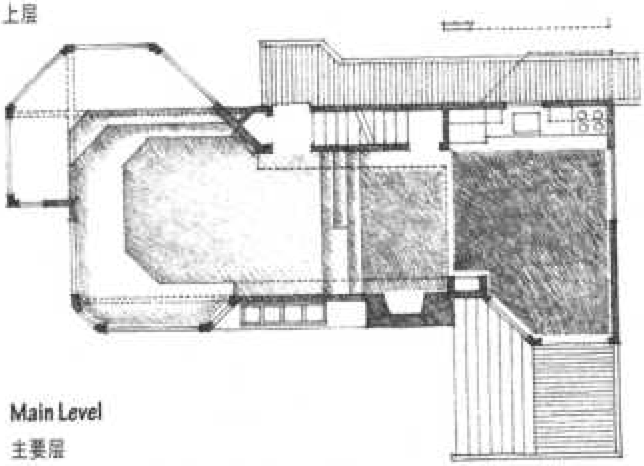
The spaces in these two buildings are individualistic in size, shape, and form. The walls that enclose them adapt their forms to accommodate the differences between adjacent spaces.

这两个建筑中的各个空间，它们的尺寸、形状和形式各不相同。围合这些空间的墙体采用不同的形式来调节邻接空间的差异。



Upper Level

上层

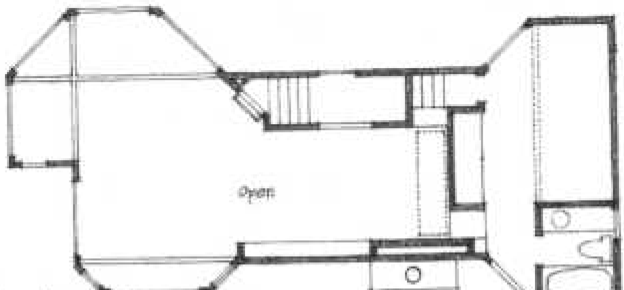


Main Level

主要层

Three spaces—the living, fireplace, and dining areas—are defined by changes in floor level, ceiling height, and quality of light and view, rather than by wall planes.

起居、壁炉和就餐区三个空间，以地面高程变化、顶棚高度变化，以及光线与景观特点的变化来限定，而不是用墙面来限定。

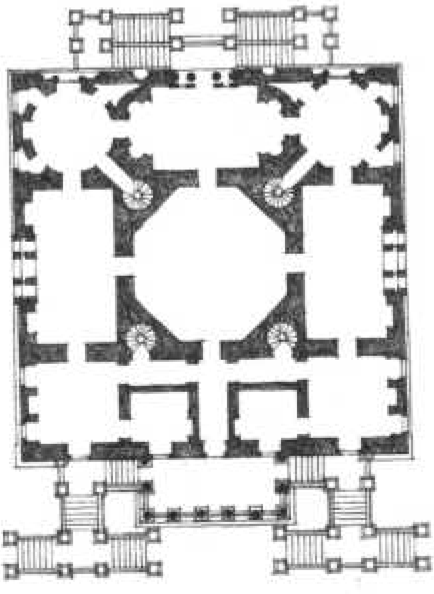


Lower Level

底层

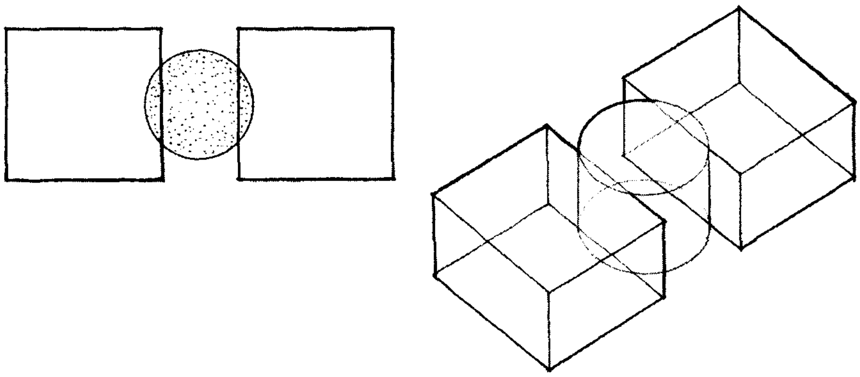
Lawrence House, Sea Ranch, California, 1966, Moore-Turnbull/MLTW

劳伦斯住宅，瑞奇海滨，加利福尼亚州，1966年，穆尔和特恩布尔/MLTW



Chiswick House, Chiswick, England, 1729, Lord Burlington & William Kent

奇斯维克府邸，奇斯维克，英格兰，1729年，L.伯林顿与W.肯特

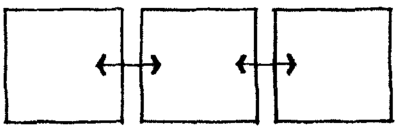


Two spaces which are separated by distance can be linked or related to each other by a third, intermediate, space. The visual and spatial relationship between the two spaces depends on the nature of the third space with which they share a common bond.

相隔一定距离的两个空间可由第三个过渡空间来连接或关联。两空间之间的视觉与空间联系取决于那个第三空间，因为两空间都与这一空间具有共享的区域。

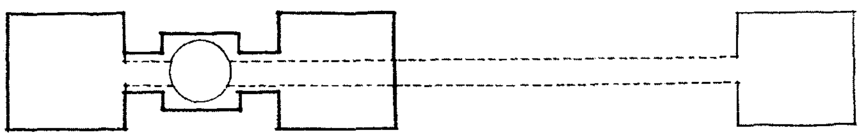
The intermediate space can differ in form and orientation from the two spaces to express its linking function.

过渡空间的形式和朝向可以不同于两个空间，以表明其关联作用。



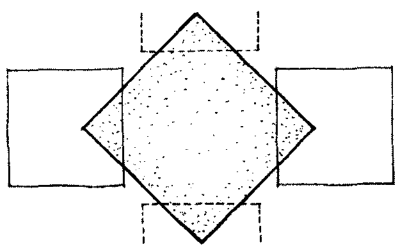
The two spaces, as well as the intermediate space, can be equivalent in size and shape and form a linear sequence of spaces.

过渡空间以及它所联系的两个空间，三者的形状和尺寸可以完全相同，并形成一个线式的空间序列。



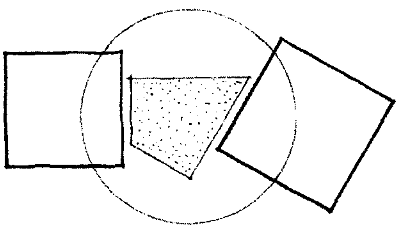
The intermediate space can itself become linear in form to link two spaces which are distant from each other, or join a whole series of spaces which have no direct relationship to one another.

过渡空间本身可以变成直线式，以联系两个相隔一定距离的空间，或者加入彼此之间没有直接关系的整个空间序列。



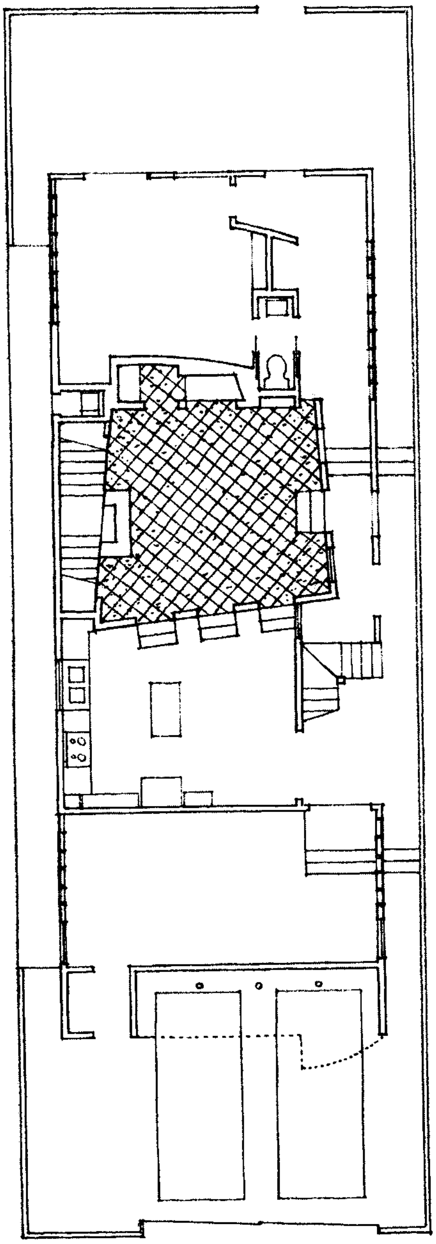
The intermediate space can, if large enough, become the dominant space in the relationship, and be capable of organizing a number of spaces about itself.

如果过渡空间足够大的话，它可以成为这种空间关系中的主导空间，并且能够在它的周围组织许多空间。



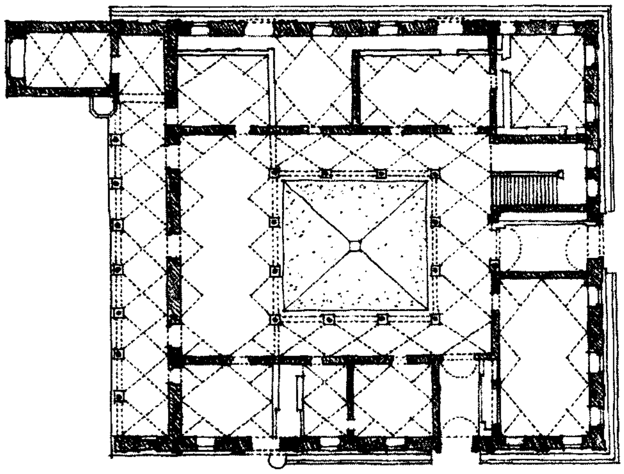
The form of the intermediate space can be residual in nature and be determined solely by the forms and orientations of the two spaces being linked.

过渡空间的形式可以是相互联系的两空间之间的剩余空间，并完全决定于两个关联空间的形式和方位。



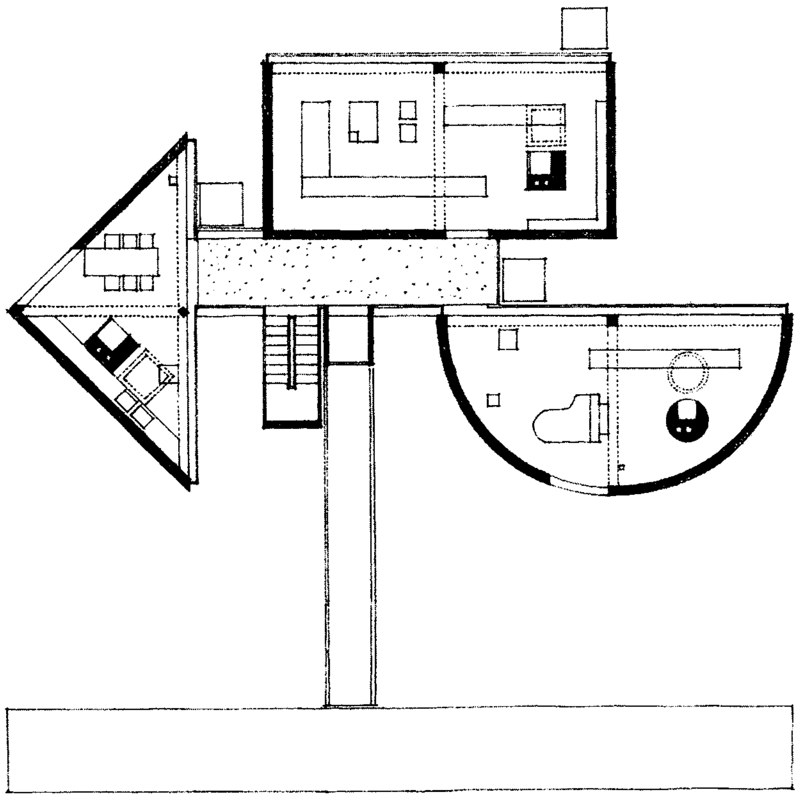
Caplin House, Venice, California, 1979, Frederick Fisher

开普林住宅，威尼斯，加利福尼亚州，1979年，F. 费舍尔



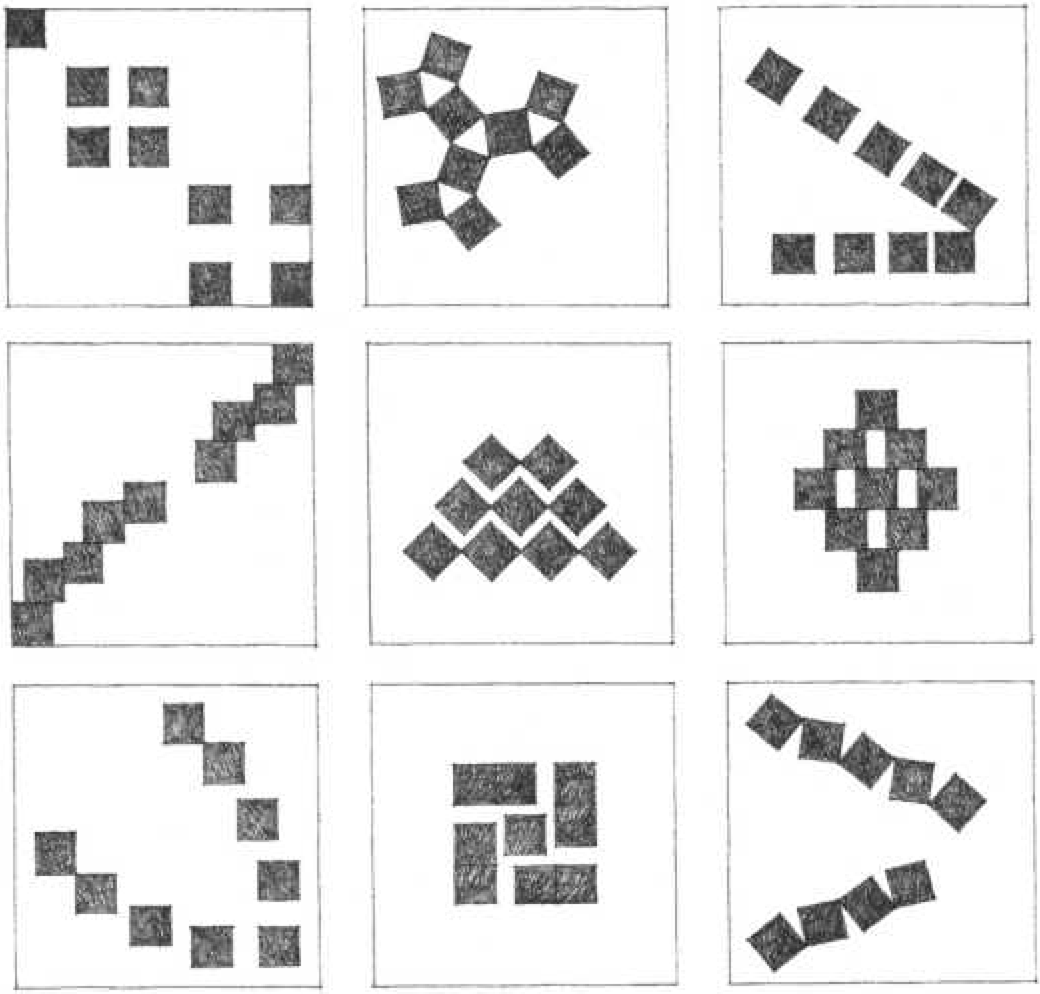
Palazzo Piccolomini, Pienza, Italy, c. 1460, Bernardo Rosselino

彼克罗米尼宫，彼恩扎，意大利，1460年，B. 罗塞林诺



One-half House (Project), 1966, John Hejduk

半室住宅（方案），1966年，J. 海杜克



Compositions of Nine Squares:
A Bauhaus Study

九个正方形的构图：包豪斯的研究

The following section lays out the basic ways we can arrange and organize the spaces of a building. In a typical building program, there are usually requirements for various kinds of spaces. There may be requirements for spaces that:

- have specific functions or require specific forms
- are flexible in use and can be freely manipulated
- are singular and unique in their function or significance to the building organization
- have similar functions and can be grouped into a functional cluster or repeated in a linear sequence
- require exterior exposure for light, ventilation, outlook, or access to outdoor spaces
- must be segregated for privacy
- must be easily accessible

以下部分列举了我们排列和组合空间的基本方法。在一份典型的建筑设计纲要中，通常对各种空间都有要求。可能对空间提出的要求如下：

- 具有特定的功能或者需要特定的形式
- 使用上机动灵活，可以自由地处理
- 在建筑组合中，具有独一无二的功能和意义
- 具有相似功能的空间，可以被组合成功能性组团，或者在线式序列中重复出现
- 为获得采光、通风、景观和通向室外空间的道路，需要向外开放
- 必须分隔以满足私密性的需要
- 必须易于人流出入

The manner in which these spaces are arranged can clarify their relative importance and functional or symbolic role in the organization of a building. The decision as to what type of organization to use in a specific situation will depend on:

- demands of the building program, such as functional proximities, dimensional requirements, hierarchical classification of spaces, and requirements for access, light, or view
- exterior conditions of the site that might limit the organization's form or growth, or that might encourage the organization to address certain features of its site and turn away from others

这些空间的布置方式，可以清楚地表明各空间在建筑物中的相对重要性，以及功能或象征作用。在特定的位置，采用何种组合方式将取决于：

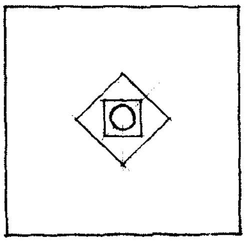
- 建筑设计纲要的要求，例如：功能的近似性、量度的要求、空间等级划分，以及出入口、采光和景观的要求
- 基地的外部条件，可能会限制或增加组合的形式，或者会促使建筑组合表达基地的某种特色而避开基地的其他特点

Each type of spatial organization is introduced by a section that discusses the formal characteristics, spatial relationships, and contextual responses of the category. A range of examples then illustrates the basic points made in the introduction. Each of the examples should be studied in terms of:

每种类型的空间组合，都附有一段介绍，讨论这类空间组合的形式特点、空间关系和环境反应。然后，用一些这方面的实例来介绍基本点。研究各个实例时，可以根据以下内容进行考虑：

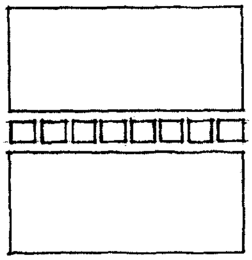
- What kinds of spaces are accommodated and where? How are they defined?
- What kinds of relationships are established among the spaces, one to another, and to the exterior environment?
- Where can the organization be entered and what configuration does the path of circulation have?
- What is the exterior form of the organization and how might it respond to its context?

- 提供了何种类型的空间？在何处？它们是如何划定的？
- 空间彼此之间，以及空间与外部环境之间，建立了什么样的联系？
- 如何进入这一空间组合？交通路线具有什么样的形状？
- 这个空间组合的外部形式如何？它如何与周围环境相呼应？



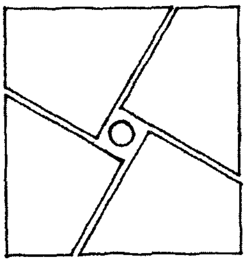
Centralized Organization
A central, dominant space about which a number of secondary spaces are grouped

集中式组合
在一个居于中心的主导空间周围组织多个次要空间



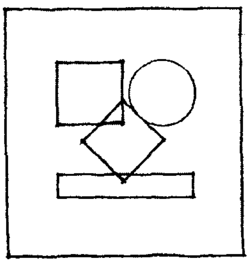
Linear Organization
A linear sequence of repetitive spaces

线式组合
重复空间的线式系列



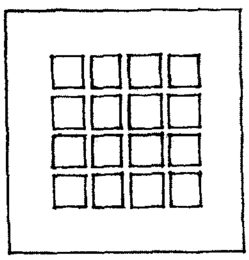
Radial Organization
A central space from which linear organizations of space extend in a radial manner

放射式组合
线式空间组合从一中心空间以放射状扩展



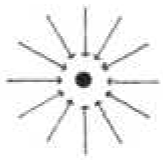
Clustered Organization
Spaces grouped by proximity or the sharing of a common visual trait or relationship

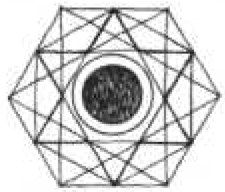
组团式组合
根据近似性、共同的视觉特性或共同的关系来组合空间

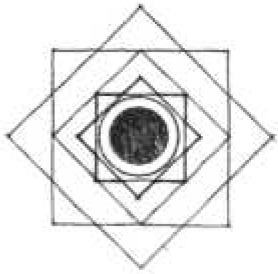


Grid Organization
Spaces organized within the field of a structural grid or other three-dimensional framework

网格式组合
在结构网格的区域内或其他三度框架中组合的空间

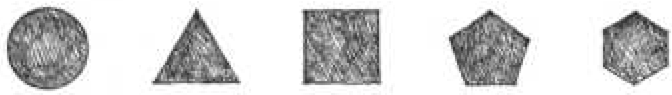






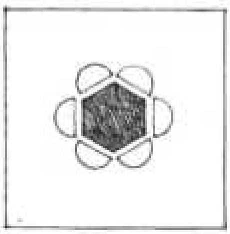
A centralized organization is a stable, concentrated composition that consists of a number of secondary spaces grouped around a large, dominant, central space.

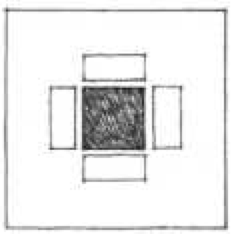
集中式组合是一种稳定的向心式的构图，它由一定数量的次要空间围绕一个大的占主导地位的中心空间构成。

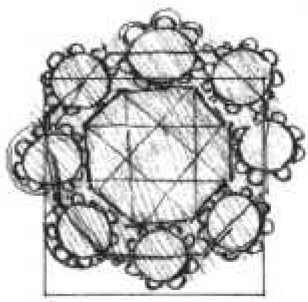


The central, unifying space of the organization is generally regular in form and large enough in size to gather a number of secondary spaces about its perimeter.

在这种组合中，居于中心地位的统一空间一般是规则的形式，并且尺寸要足够大，以便许多次要空间集结在其周边。



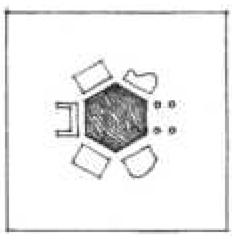


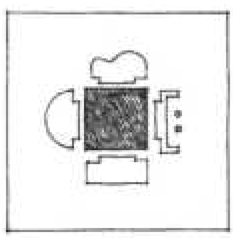


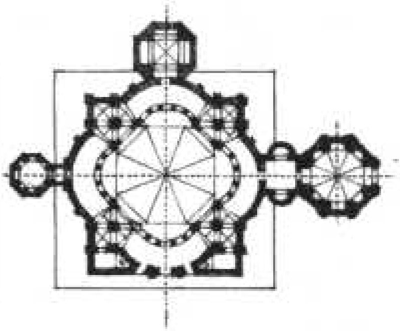
Ideal Church by Da Vinci
理想教堂，达·芬奇

The secondary spaces of the organization may be equivalent to one another in function, form, and size, and create an overall configuration that is geometrically regular and symmetrical about two or more axes.

组合中的次要空间，它们的功能、形式、尺寸可以彼此相当，形成几何形式规整、关于两条或多条轴线对称的总体造型。







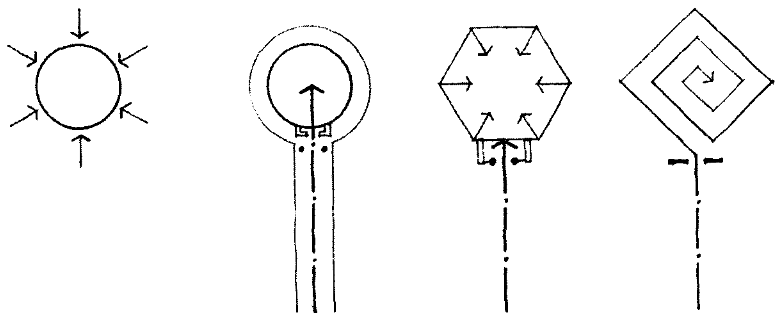
San Lorenzo Maggiore
圣·洛伦佐·马乔列

The secondary spaces may differ from one another in form or size in order to respond to individual requirements of function, express their relative importance, or acknowledge their surroundings. This differentiation among the secondary spaces also allows the form of a centralized organization to respond to the environmental conditions of its site.

次要空间的形式或尺寸也可以互不相同，以适应各自的功能要求，表达它们之间相对的重要性或者对周围环境做出反应。次要空间中的差异，也使集中式组合的形式能够适应基地的环境条件。

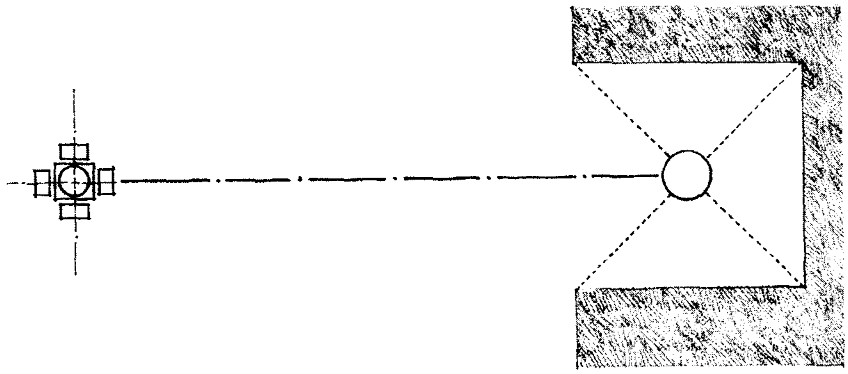
Since the form of a centralized organization is inherently non-directional, conditions of approach and entry must be specified by the site and the articulation of one of the secondary spaces as an entrance or gateway.

由于集中式组合这种形式本身没有方向性，因此通道和入口的情况必须在基地上表达清楚，并且必须把一个次要空间明确地表达为入口或门道。



The pattern of circulation and movement within a centralized organization may be radial, loop, or spiral in form. In almost every case, however, the pattern will terminate in or around the central space.

在集中式空间组合中，流线与运动的模式可以是放射状、环状或螺旋状的形式。但是，几乎在所有情形下，这一形式都将终止于中央空间本身或其周围。

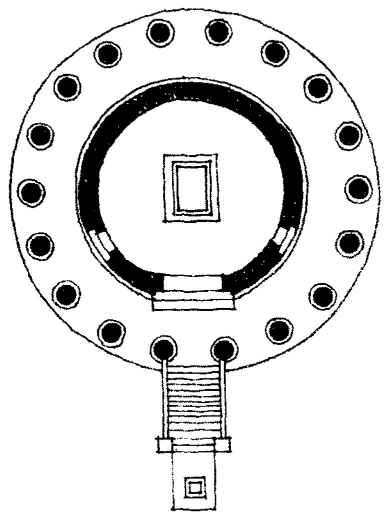


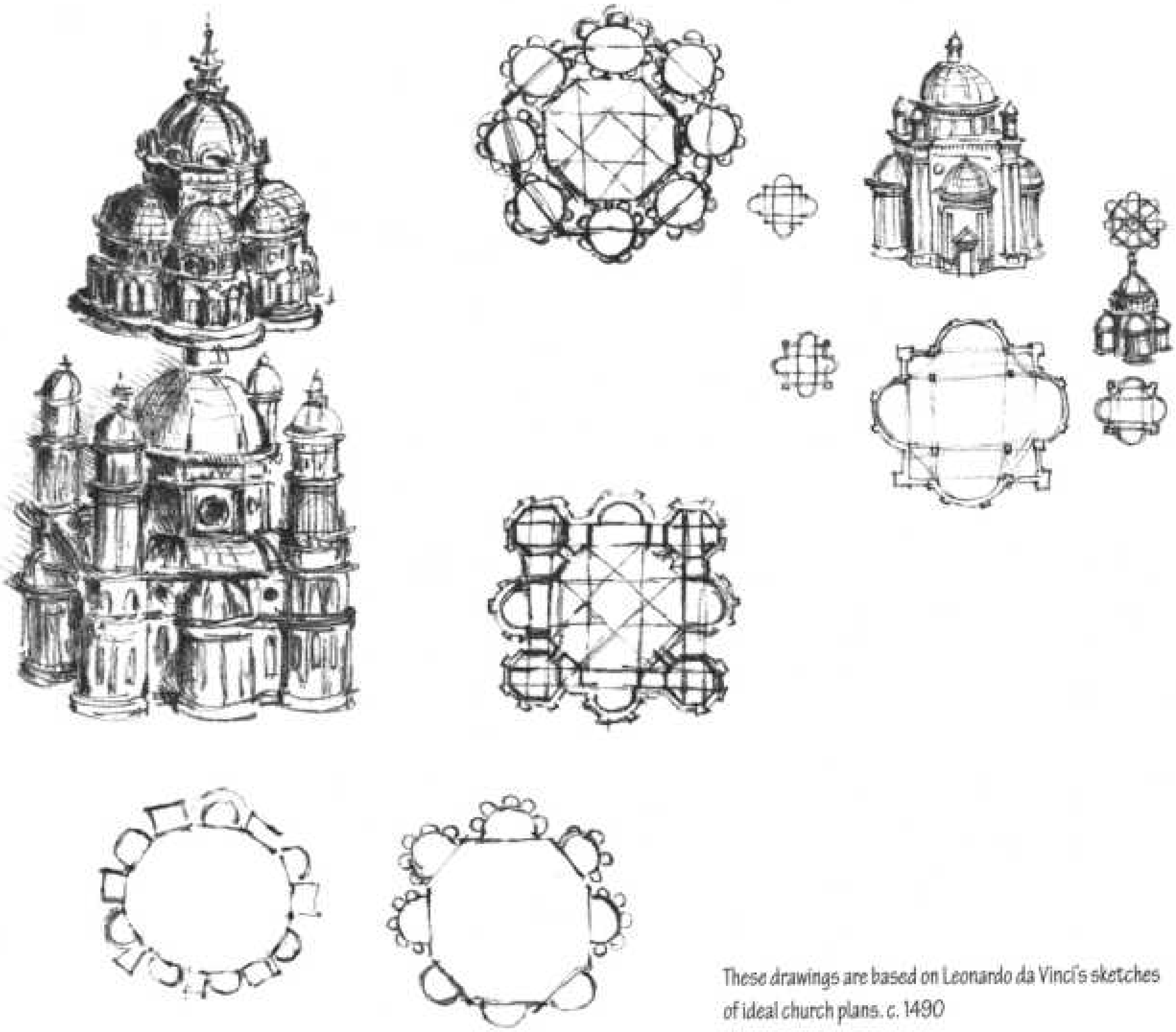
Centralized organizations whose forms are relatively compact and geometrically regular can be used to:

- establish points or places in space
- terminate axial conditions
- serve as an object-form within a defined field or volume of space

集中式组合的形式相对紧凑、具有规整的几何图形，可以用来：

- 在空间中建立点或场所
- 终止轴向构图
- 在一个限定范围和空间容积中，作为实体形式



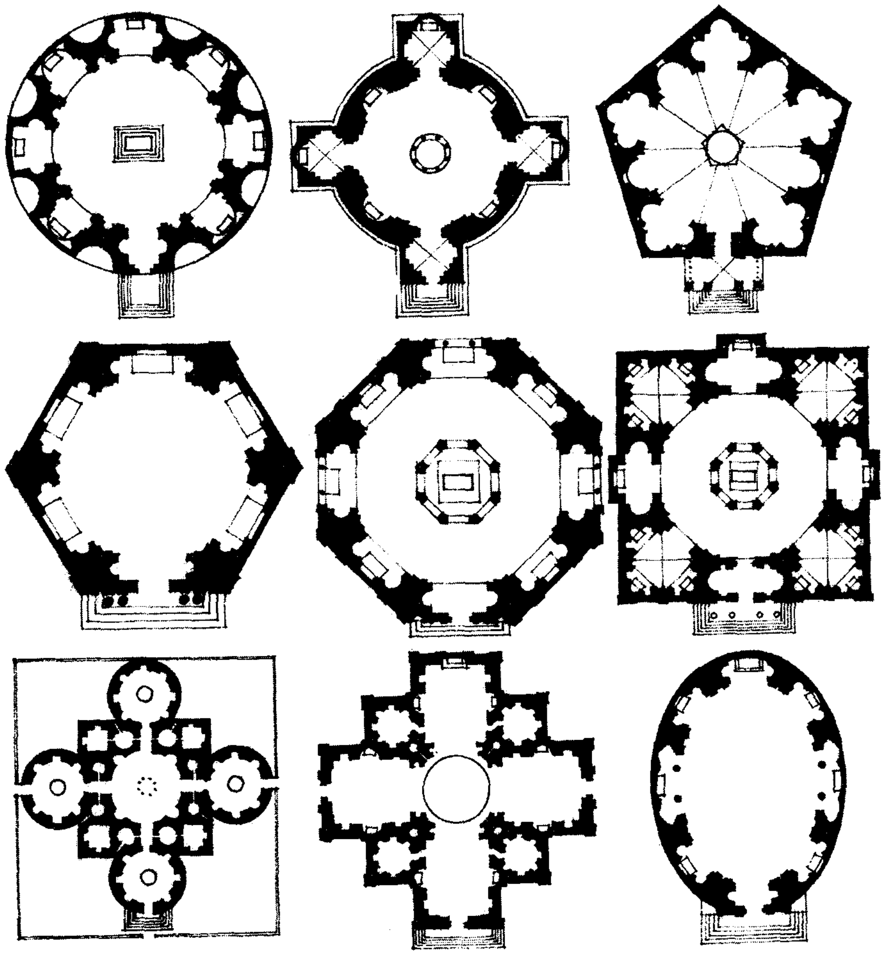


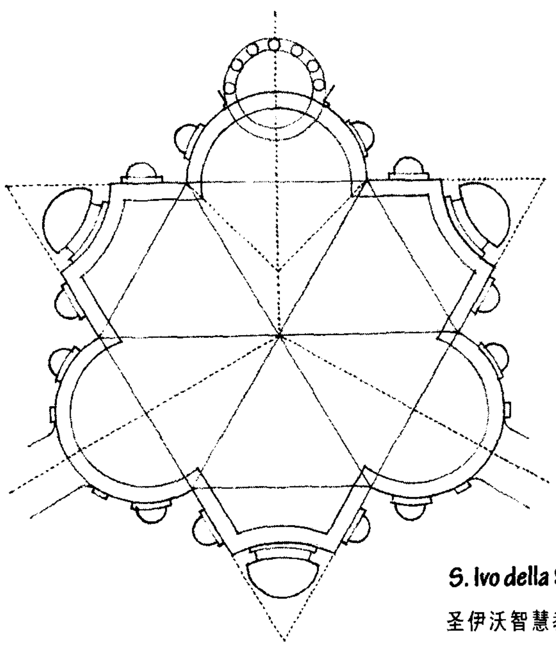
These drawings are based on Leonardo da Vinci's sketches of ideal church plans. c. 1490

这些图是根据列奥纳多·达·芬奇为理想教堂所做的平面草图而绘制的，1490年

Centralized Plans, 1547, Sebastiano Serlio

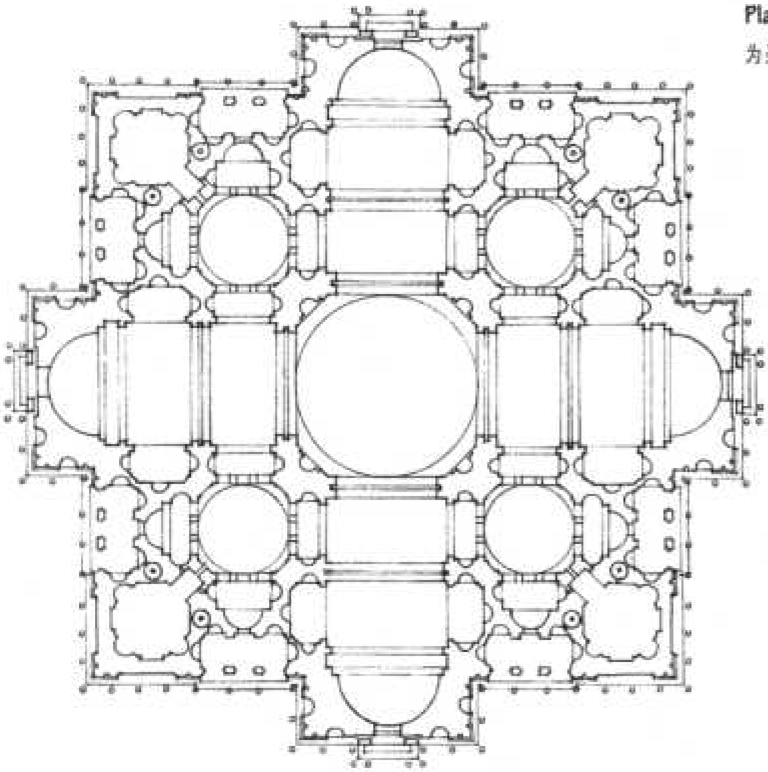
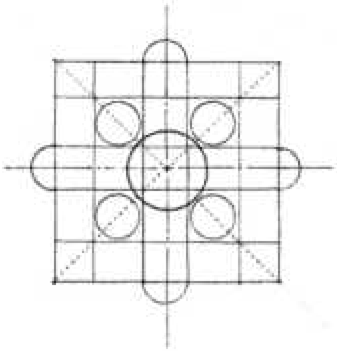
集中式平面，1547年，S. 赛利奥





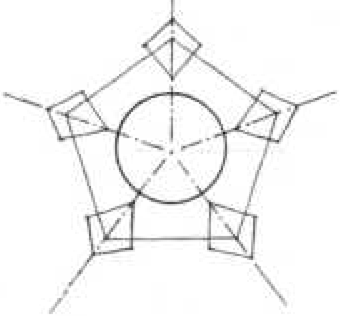
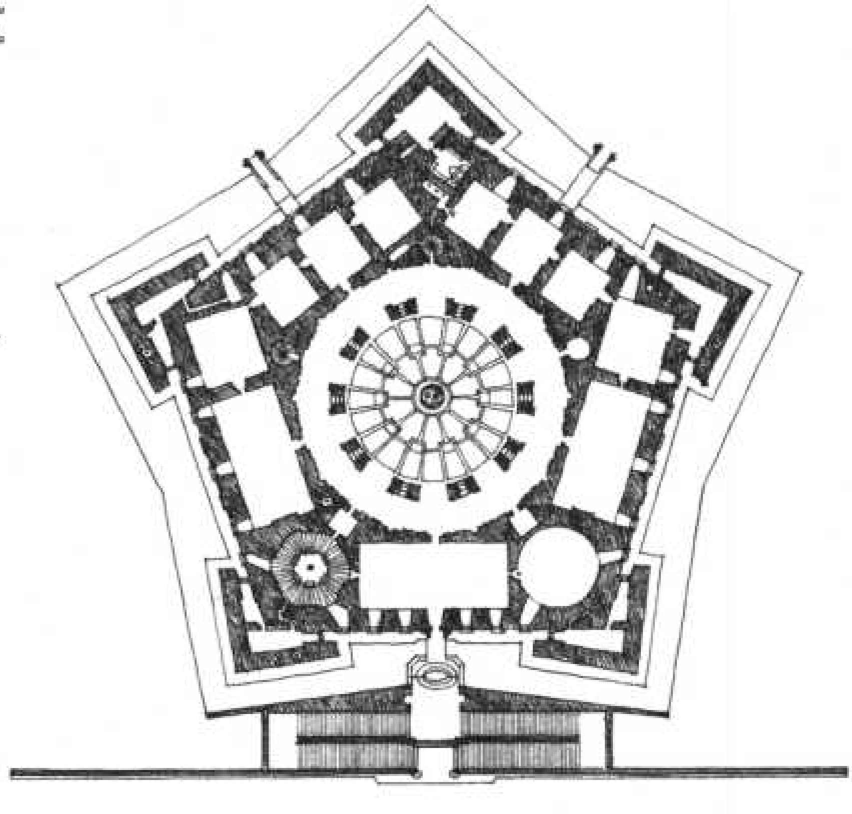
S. Ivo della Sapienze, Rome, 1642–1650, Francesco Borromini

圣伊沃智慧教堂，罗马，1642年—1650年，F. 博洛米尼

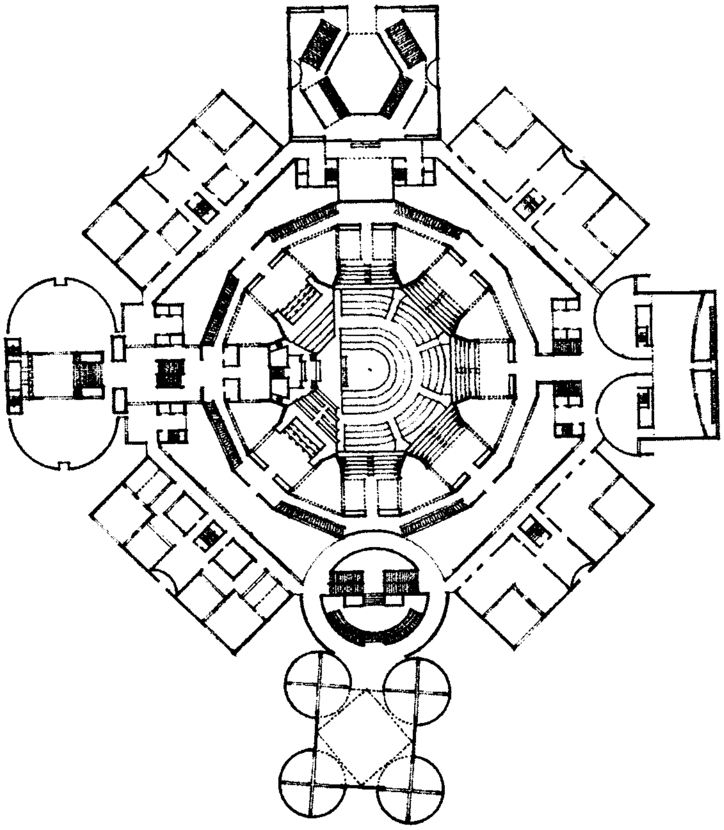
Plan for St. Peter's (First Version), *Rome, c. 1503, Donato Bramante*

为圣彼得大教堂所作的平面（第一稿），罗马，1503年，D.伯拉孟特

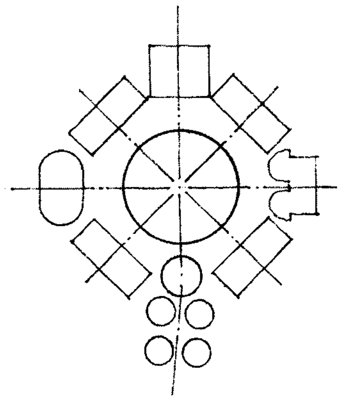
Palazzo Farnese, *Caprarola, 1547–1549, Giacomo da Vignola*

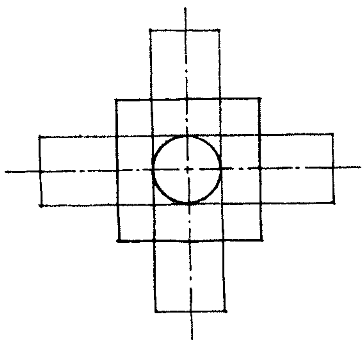
法尔尼斯宫，卡普拉洛拉，1547年—1549年，G.达·维尼奥拉

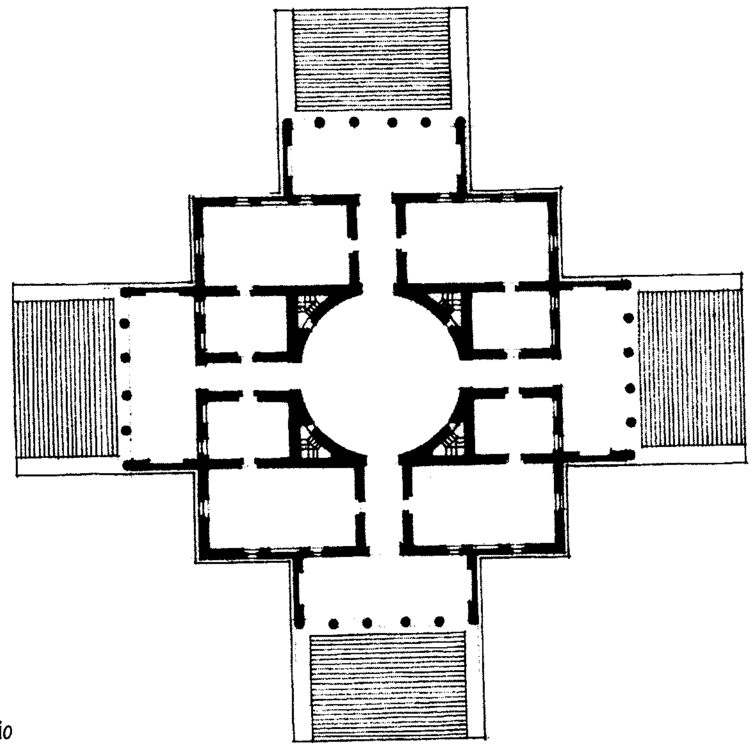


National Assembly Building, Capitol Complex at Dacca, Bangladesh, begun 1962, Louis Kahn

议会大厦，达卡国会大厦综合体，孟加拉国，始于1962年，L.康

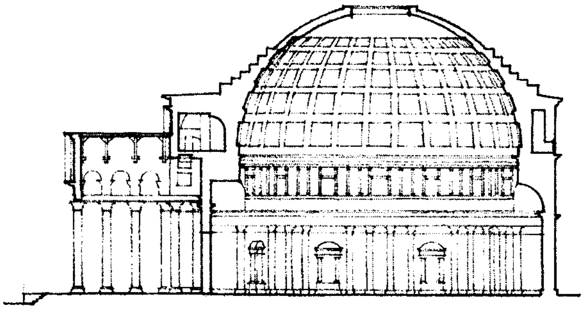


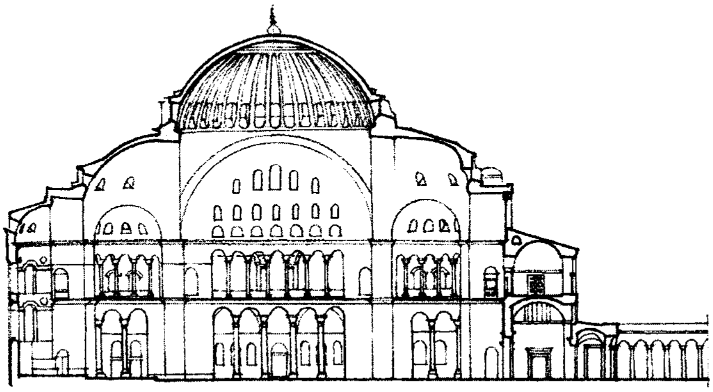


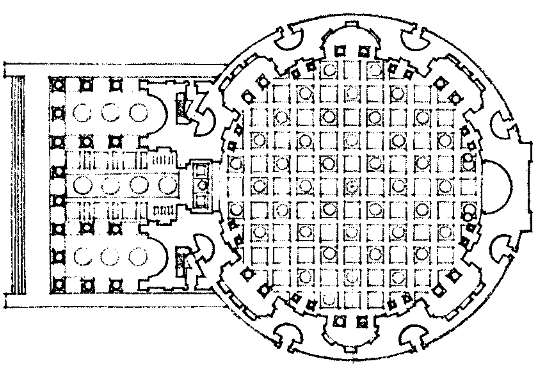


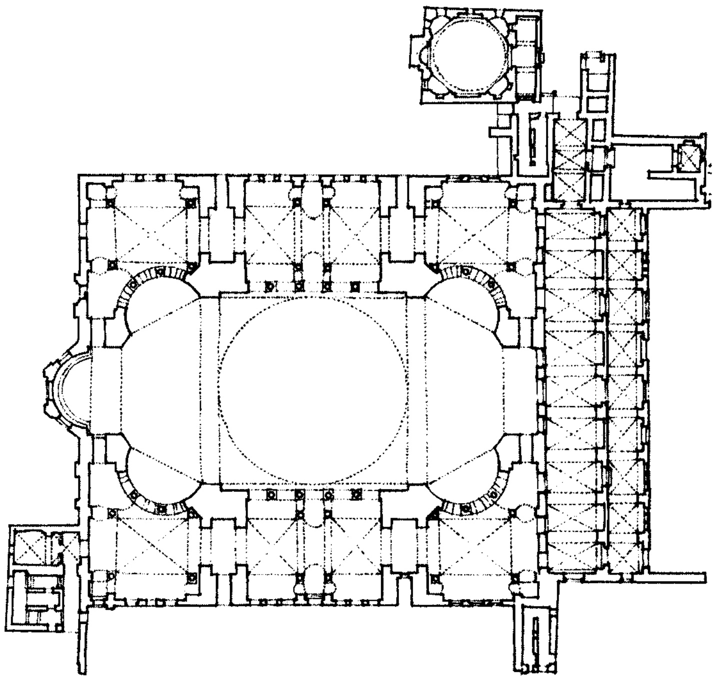
Villa Capra (The Rotunda), Vicenza, Italy, 1552–1567, Andrea Palladio

卡普拉别墅（圆厅别墅），维琴察，意大利，1552年—1567年，A. 帕拉蒂奥







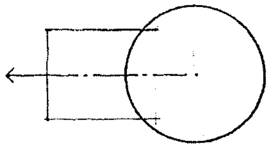


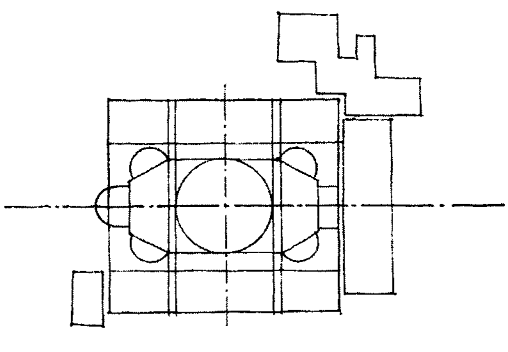
The Pantheon, Rome, A.D. 120-124. Portico from temple of 25 B.C.

万神庙，罗马，120年—124年，门廊为公元前25年之神庙

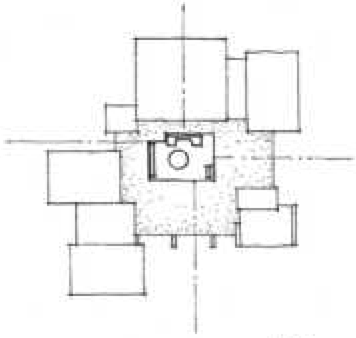
Hagia Sophia, Constantinople (Istanbul), A.D. 532–537, Anthemius of Tralles and Isidorus of Miletus

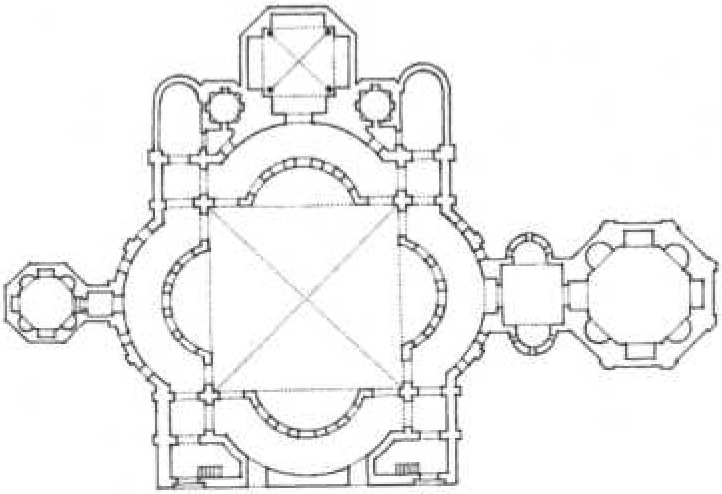
圣·索菲亚教堂，君士坦丁堡（伊斯坦布尔），532年—537年，特拉里斯的安狄缪斯与米列都斯的伊西多鲁斯







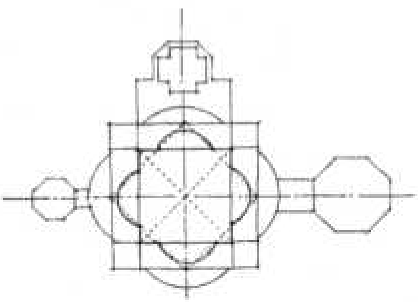


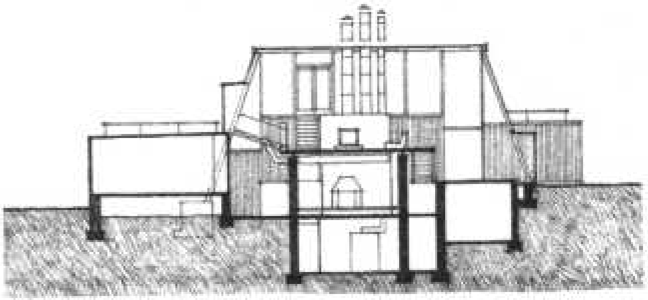




San Lorenzo Maggiore, Milan, Italy, c. A.D. 480
圣·洛伦佐·马乔列，米兰，意大利，480年

Greenhouse House, Connecticut, 1973–1975, John M. Johanse
温室住宅，康涅狄格州，1973年—1975年，J. M. 约翰森

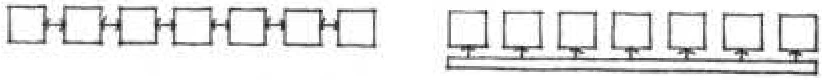




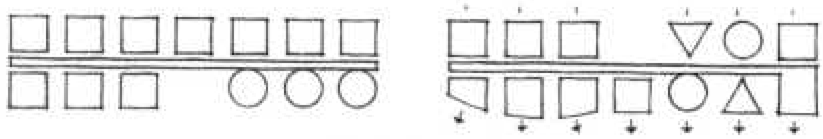


A linear organization consists essentially of a series of spaces. These spaces can either be directly related to one another or be linked through a separate and distinct linear space.

线式组合实际上包含着一个空间系列。这些空间既可直接地逐个连接，也可由一个单独的不同的线式空间来联系。

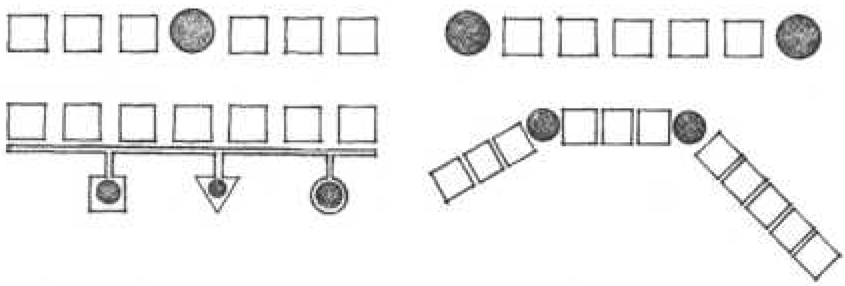


A linear organization usually consists of repetitive spaces which are alike in size, form, and function. It may also consist of a single linear space that organizes along its length a series of spaces that differ in size, form, or function. In both cases, each space along the sequence has an exterior exposure.



线式空间组合通常由尺寸、形式和功能都相同的空间重复出现而构成，也可将一连串尺寸、形式或功能不同的空间，用一个独立的线式空间沿其长度将那些空间组合起来。在这两种情况下，序列上的每个空间都朝向外面。

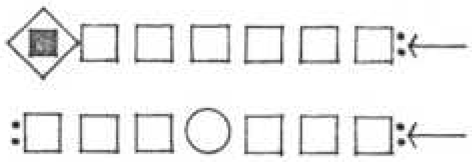
Spaces that are functionally or symbolically important to the organization can occur anywhere along the linear sequence and have their importance articulated by their size and form. Their significance can also be emphasized by their location:



- at the end of the linear sequence
- offset from the linear organization
- at pivotal points of a segmented linear form

对线式组合而言，在功能方面或象征方面具有重要性的空间，可以沿着线式序列，随时出现在任何一处，并且以尺寸和形式来表明它们的重要性。它们的重要性也可以通过所处的位置加以强调：

- 位于线式序列的终点
- 偏离线式组合
- 在某段线式形式的转折点上



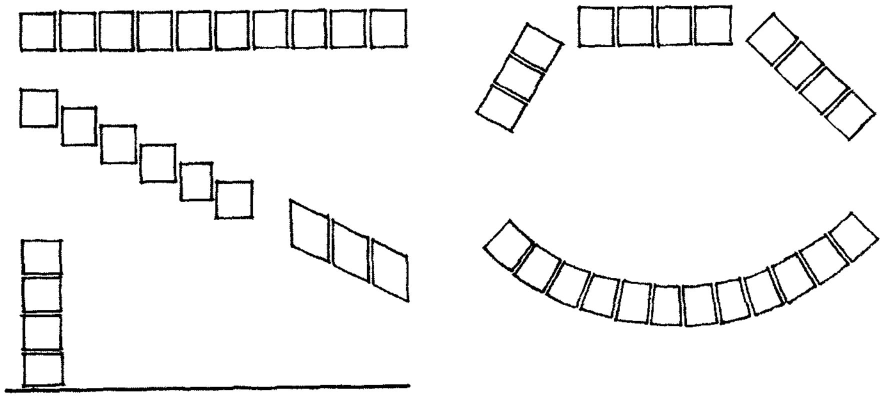
Because of their characteristic length, linear organizations express a direction and signify movement, extension, and growth. To limit their growth, linear organizations can be terminated by a dominant space or form, by an elaborate or articulated entrance, or by merging with another building form or the topography of its site.



因为线式组合的特征是“长”，所以它表达了一种方向性，同时意味着运动、延伸和增长。为了限制线式组合的增长态势，这种组合可以终止于一个主导空间或主导形式，或者终止于一个精心设计、表现清晰的入口，也可以与其他建筑形式或基地的地形融为一体。

The form of a linear organization is inherently flexible and can respond readily to various conditions of its site. It can adapt to changes in topography, maneuver around a body of water or a stand of trees, or turn to orient spaces to capture sunlight and views. It can be straight, segmented, or curvilinear. It can run horizontally across its site, diagonally up a slope, or stand vertically as a tower.

线式组合的形式本身具有可变性，容易适应场地的各种条件。它可根据地形的变化而调整，或环绕一片水面、一丛树林，或改变其空间朝向以获得阳光和景观。它既能采用直线式、折线式，也能采用弧线式。它可以水平穿过基地，沿斜坡而上，也可以像塔一般垂直耸立。

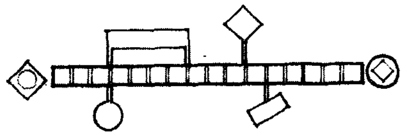


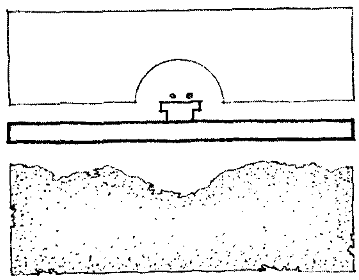
The form of a linear organization can relate to other forms in its context by:

- linking and organizing them along its length
- serving as a wall or barrier to separate them into different fields
- surrounding and enclosing them within a field of space

线式组合可以用下列方式与环境中其他的形体相联系：

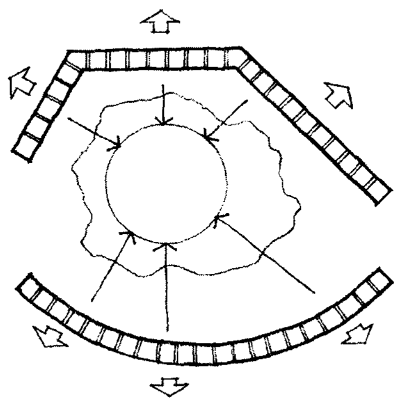
- 沿其长向连接和组合其他形式
- 作为墙或屏障把其他形体隔离在另外一个不同的区域内
- 在某一空间区域内，环绕或围合其他形体

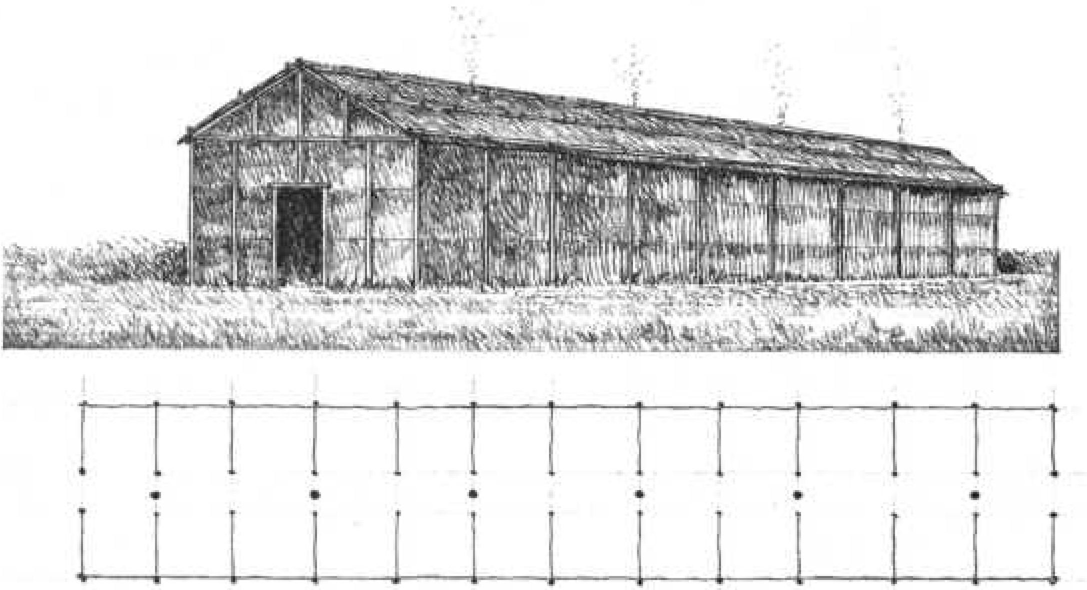




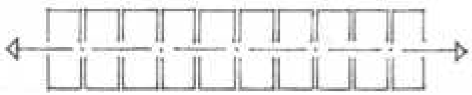
Curved and segmented forms of linear organizations enclose a field of exterior space on their concave sides and orient their spaces toward the center of the field. On their convex sides, these forms appear to front space and exclude it from their fields.

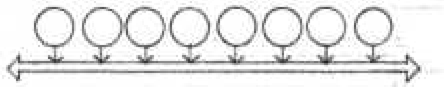
曲线和折线式的线式组合，在其凹面一侧围起了一块室外空间领域，而且使其空间指向该领域的中心。在凸面一侧，这些形体面对外部空间，并且把那个空间排斥在形体所围合的区域之外。

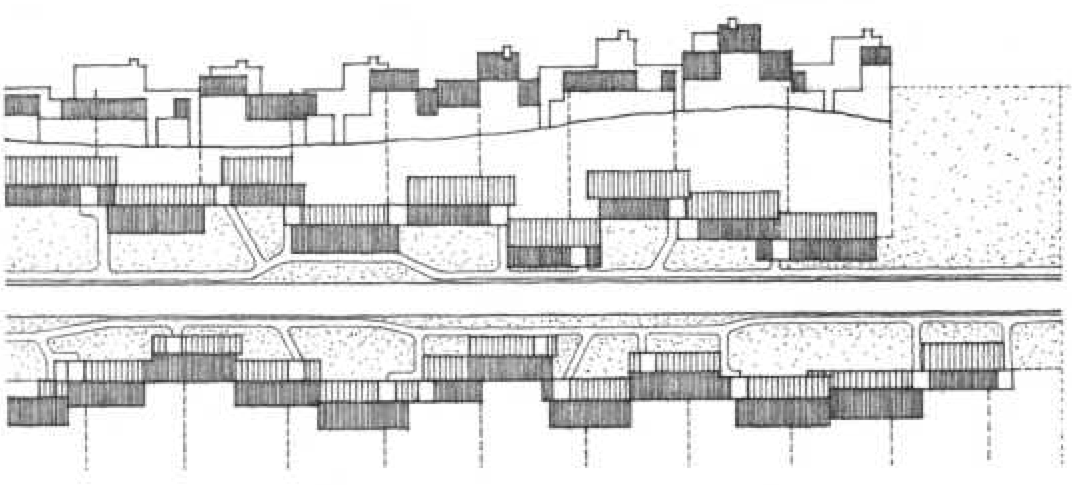




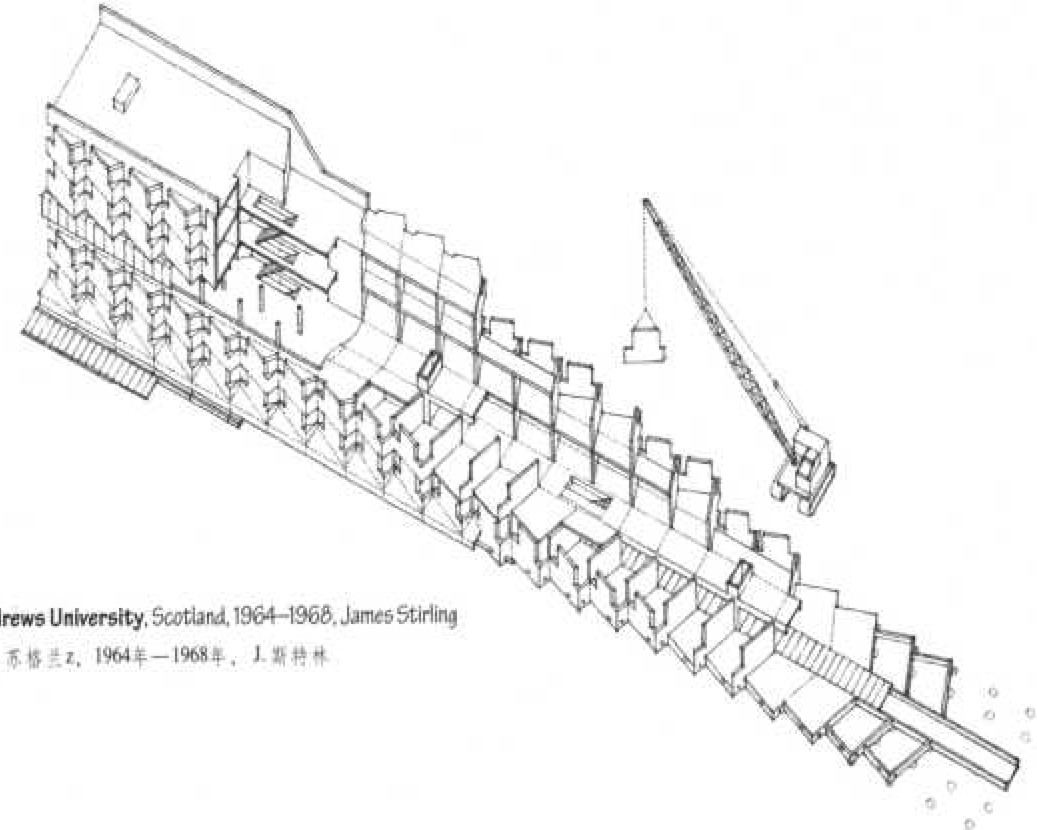
Longhouse, *a dwelling type of the member tribes of the Iroquois Confederacy in North America, c. 1600.*
长屋，北美易洛魁族联邦部落成员的住宅形式，1600年



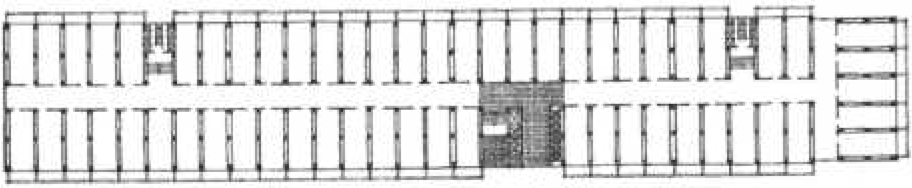




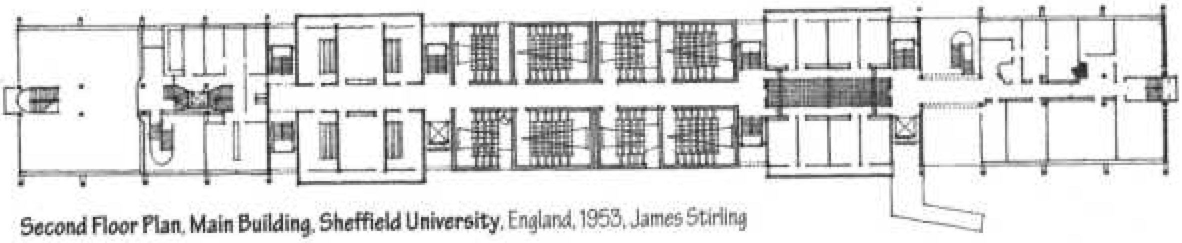
Terraced Housing Fronting a Village Street, Village Project, 1955, James Stirling (Team X)
朝向村庄街道的台地式住宅，村落方案，1955年，J.斯特林（十人设计组）



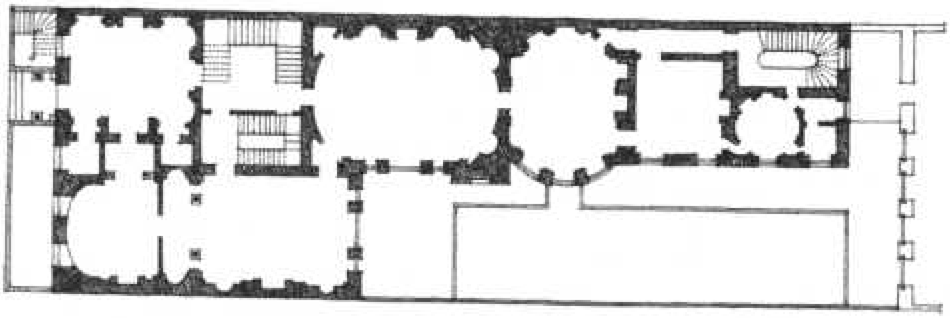
Residential Expansion, St. Andrews University, Scotland, 1964–1968, James Stirling
住宅的扩建，圣安德鲁斯大学，苏格兰z，1964年—1968年，J.斯特林



Typical Apartment Floor, Unité d'Habitation, Marseilles, 1946–1952, Le Corbusier
典型的公寓平面，公寓大楼，马赛，1946年—1952年，勒·柯布西埃

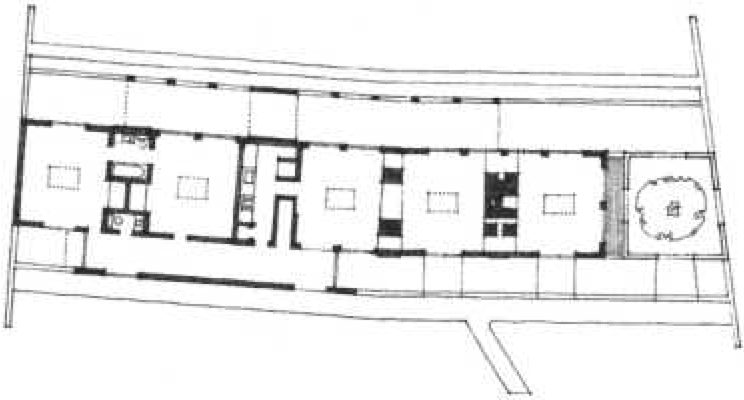


Second Floor Plan, Main Building, Sheffield University, England, 1953, James Stirling
二层平面，主楼，谢菲尔德大学，英格兰，1953年，J.斯特林



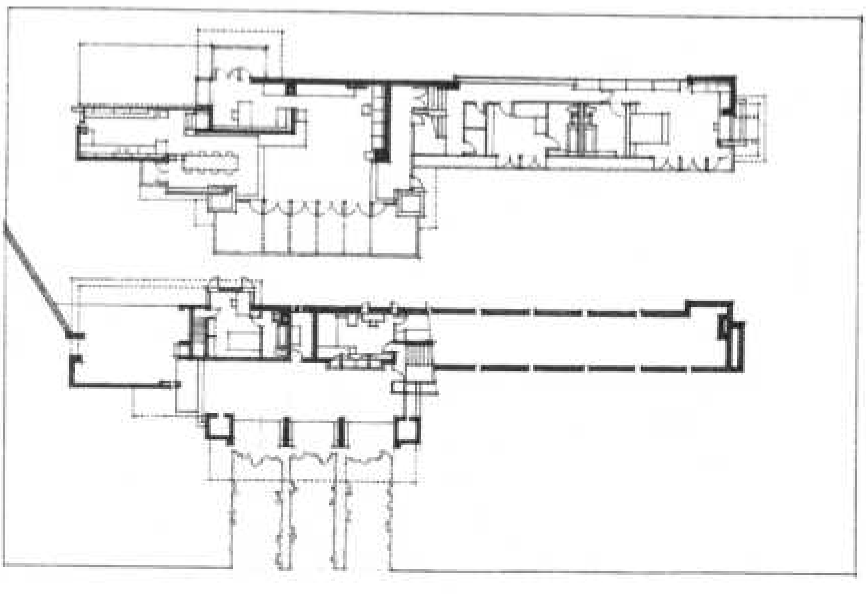
Lord Derby's House, London, 1777, Robert Adam

L.德比住宅，伦敦，1777年，R.亚当



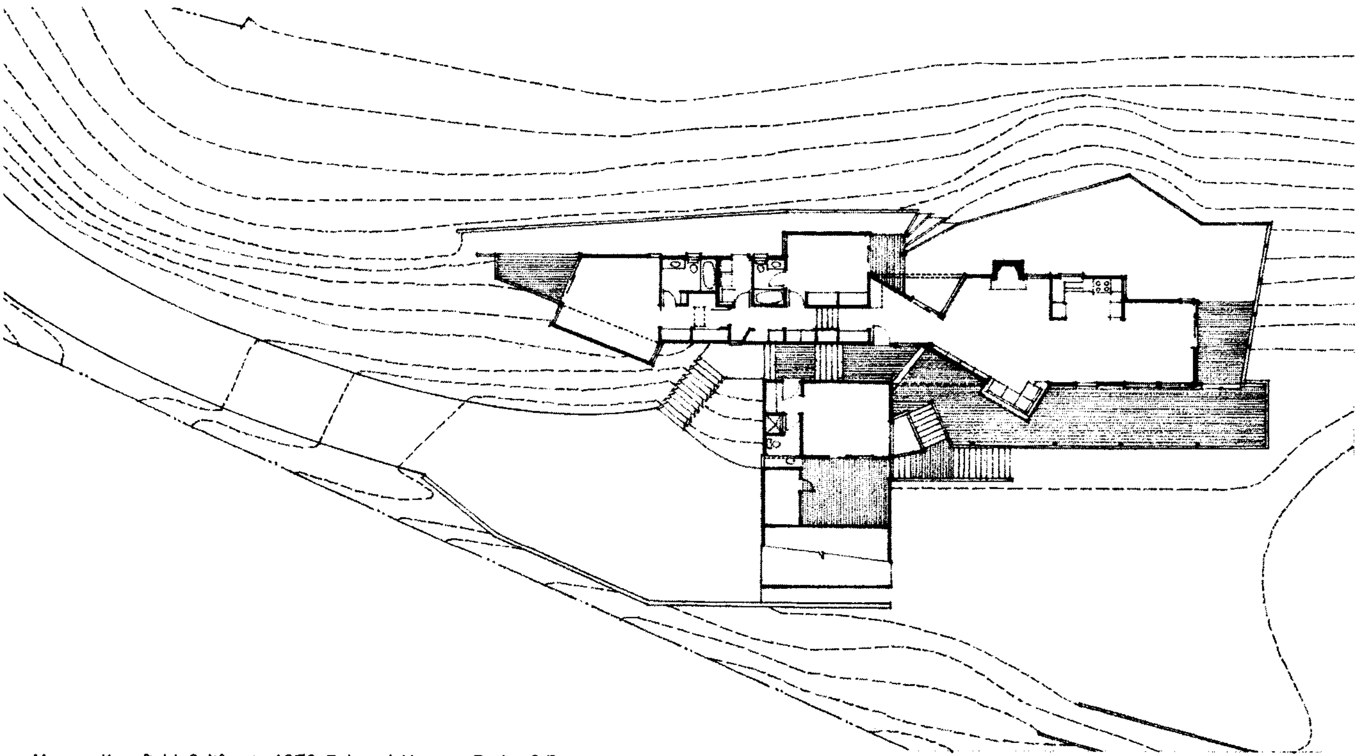
Pearson House (Project), 1957, Robert Venturi

皮尔逊住宅（方案），1957年，R.文丘里



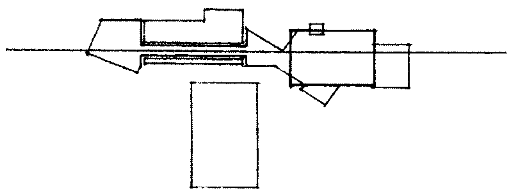
Lloyd Lewis House, Libertyville, Illinois, 1940, Frank Lloyd Wright

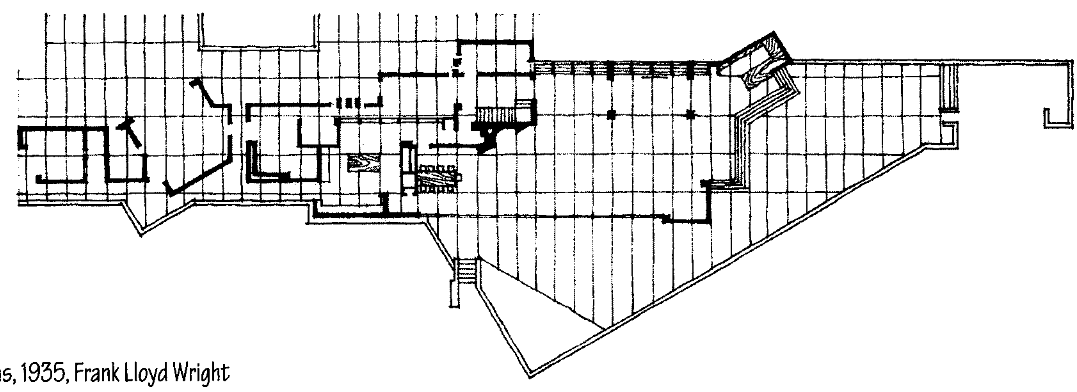
L.刘易斯住宅，利柏蒂维尔，伊利诺斯州，1940年，F.L.莱特



Romano House, Kentfield, California, 1970, Esherick Homsey Dodge & Davis

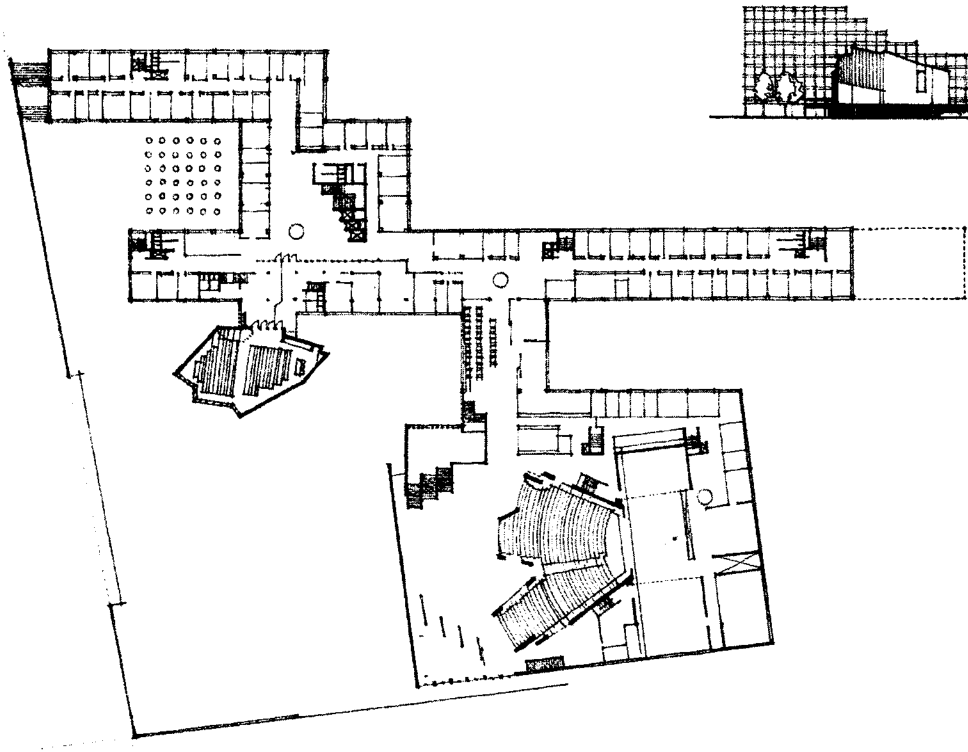
罗马诺住宅，康特费尔德，加利福尼亚州，1970年，E. D. 道奇与戴维斯

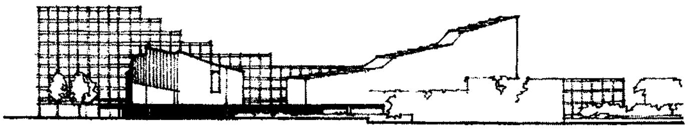




Marcus House (Project), Dallas, Texas, 1935, Frank Lloyd Wright

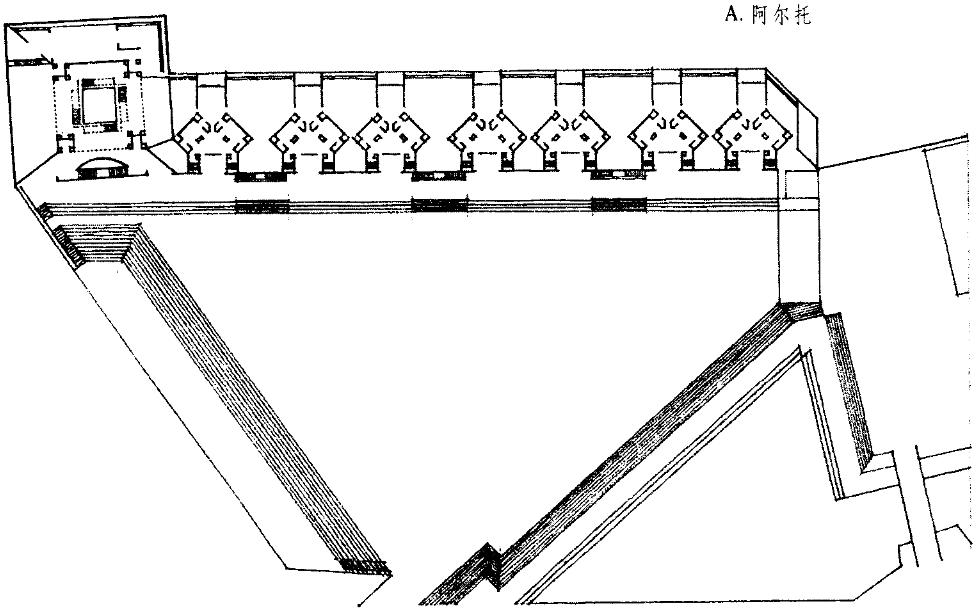
马库斯住宅（方案），达拉斯，得克萨斯州，1935年，F. L. 莱特





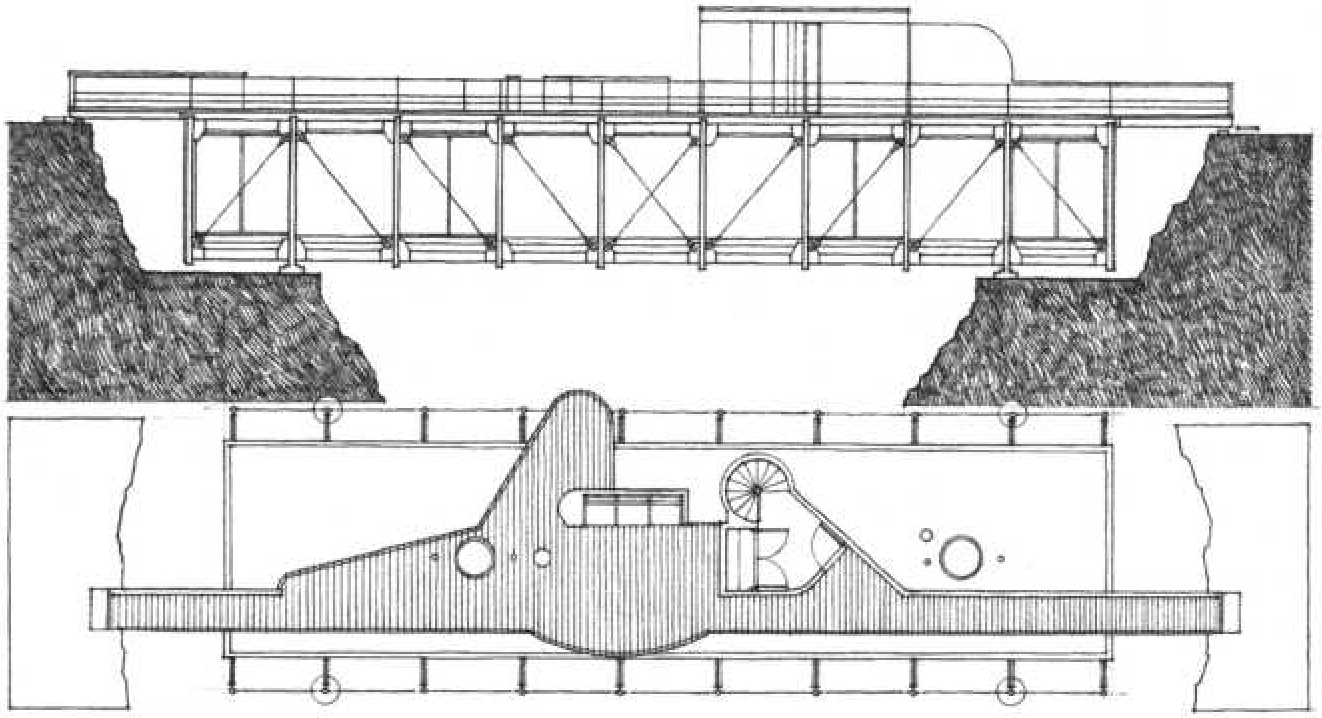
Town Center for Castrop-Rauxel, Germany, (Competition Entry), 1965, Alvar Aalto

卡斯特罗普-劳克塞尔市镇中心，德国，（竞赛入选方案），1965年，A. 阿尔托

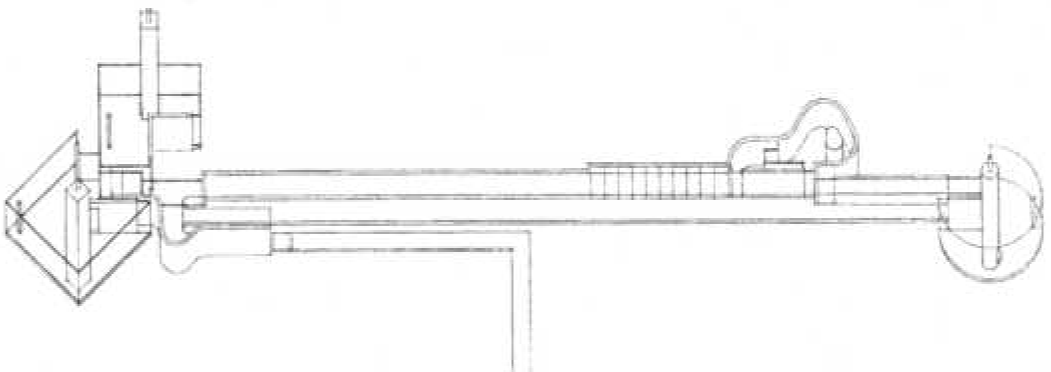


Interama, Project for an Inter-American Community, Florida, 1964–1967, Louis Kahn

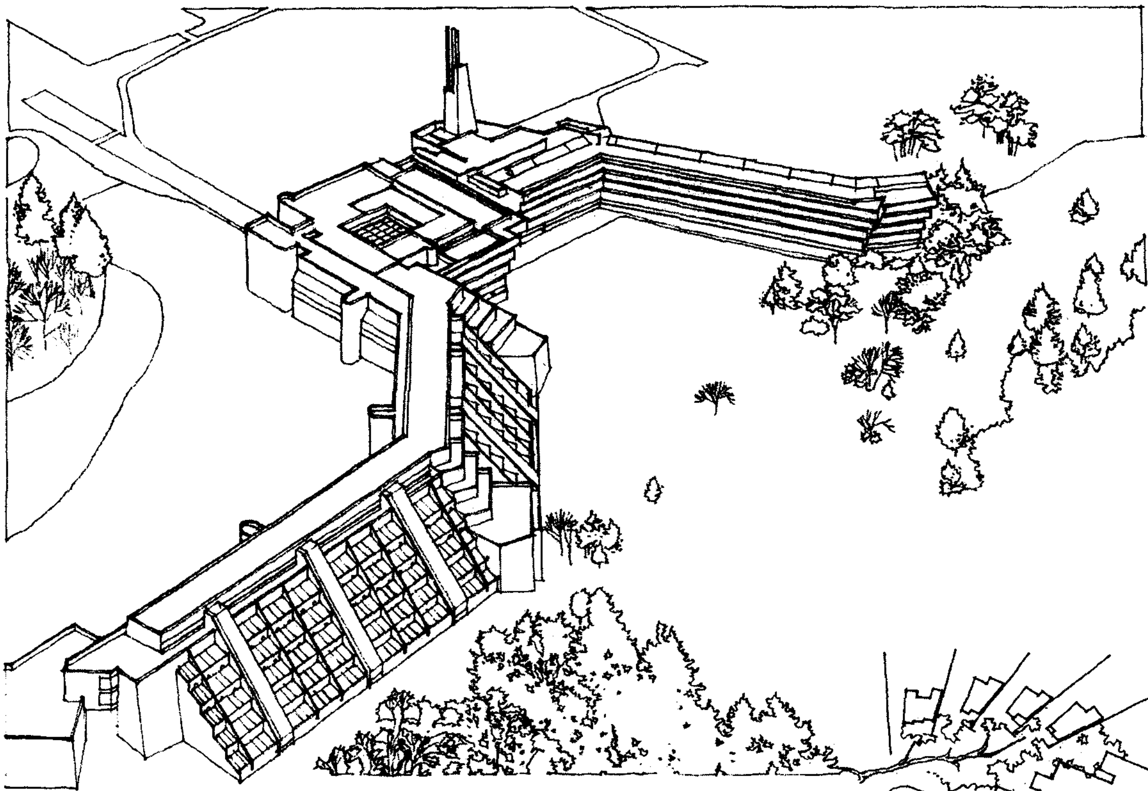
因特拉玛，为美洲国家共同体大厦所做的方案，佛罗里达州，1964年—1967年，L. 康



Bridge House (Project), Christopher Owen
桥式住宅（方案）、C. 欧文

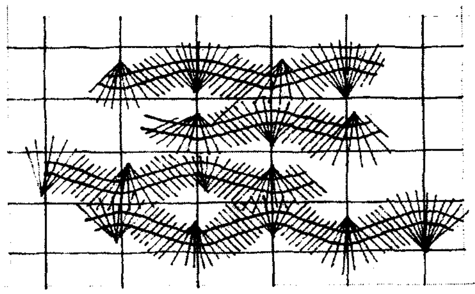


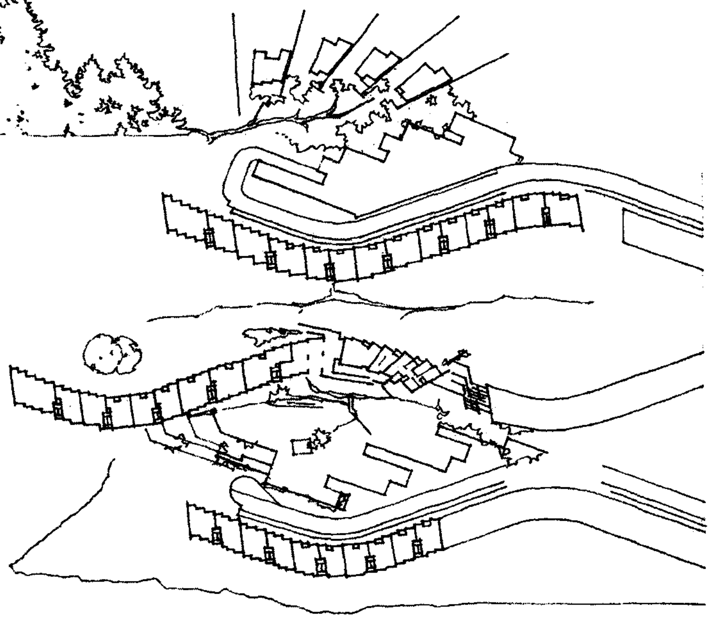
House 10 (Project), 1966, John Hejduk
10号住宅（方案）、1966年、J. 海杜克



Scarborough College, Westhill, Ontario, 1964, John Andrews

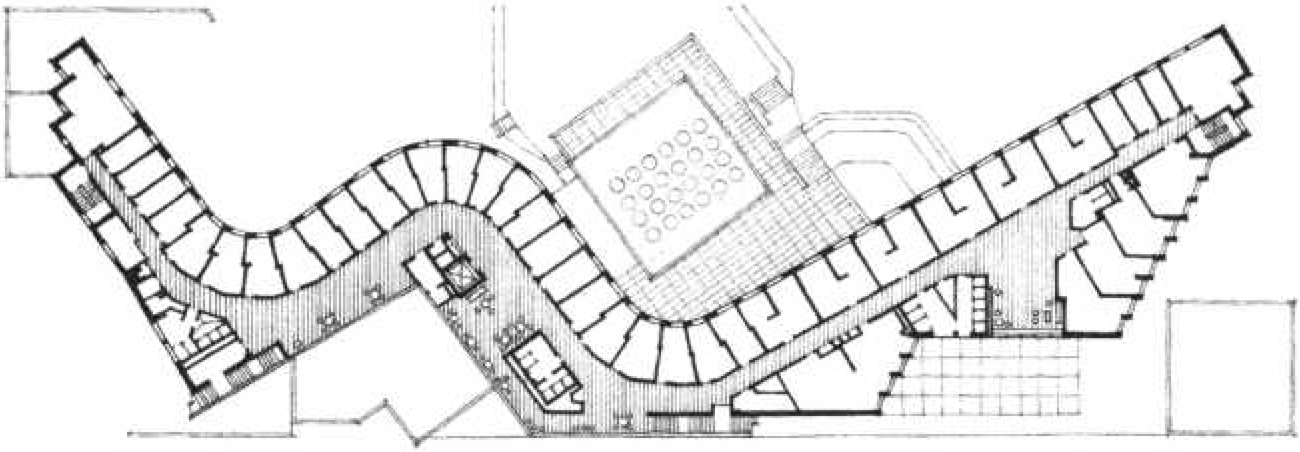
斯卡伯勒学院，韦斯特希尔，安大略省，1964年，J. 安德鲁斯





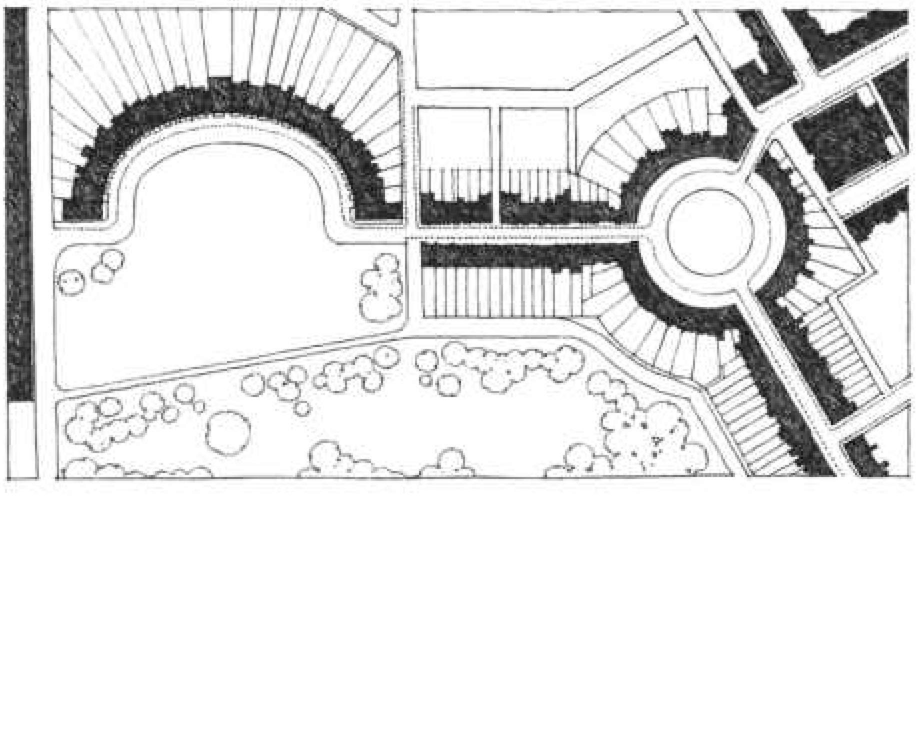
Housing Development, Pavia, Italy, 1966, Alvar Aalto

住宅区开发，帕维亚，意大利，1966年，A. 阿尔托



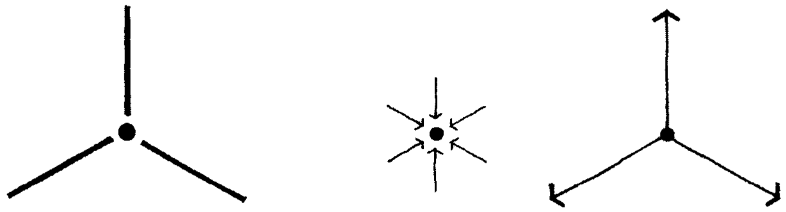
Typical Upper-floor Plan, Baker House, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1948, Alvar Aalto

典型的上层平面，贝克大楼，麻省理工学院，剑桥，马萨诸塞州，1948年，A. 阿尔托



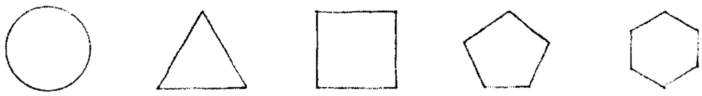
Plan for the Circus (1754, John Wood, Sr.) and the **Royal Crescent** (1767–1775, John Wood) at Bath, England

竞技场平面（1754年，J. 伍德）与皇家新月场（1767年—1775年，J.伍德）巴斯，英格兰



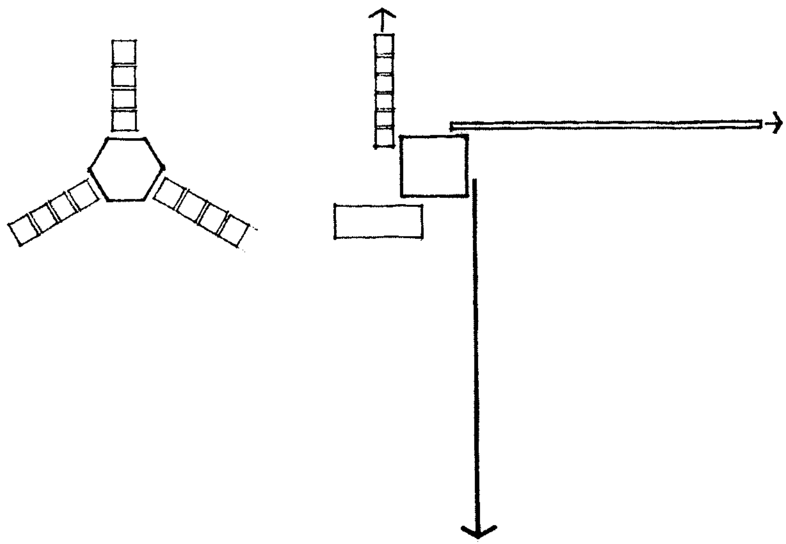
A radial organization of space combines elements of both centralized and linear organizations. It consists of a dominant central space from which a number of linear organizations extend in a radial manner. Whereas a centralized organization is an introverted scheme that focuses inward on its central space, a radial organization is an extroverted plan that reaches out to its context. With its linear arms, it can extend and attach itself to specific elements or features of its site.

空间的放射式组合，综合了集中式与线式组合的要素。这类组合包含一个居于中心的主导空间，多个线式组合从这里呈放射状向外延伸。集中式组合是一个内向的图案，向内聚焦于中央空间；而放射式的组合则是外向型平面，向外伸展到其环境中。通过其线式的臂膀，放射式组合能向外伸展，并将自身与基地上的特定要素或地貌连在一起。



As with centralized organizations, the central space of a radial organization is generally regular in form. The linear arms, for which the central space is the hub, may be similar to one another in form and length and maintain the regularity of the organization's overall form.

正如集中式组合一样，放射状组合的中心空间，通常也是规则的形式。以中央空间为核心的线式臂膀可能在形式和长度上彼此相近，并保持着这类组合总体形式的规整性。

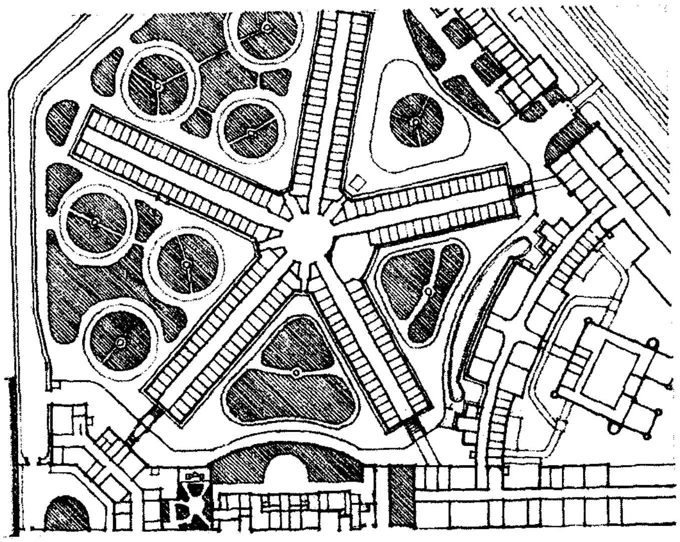


The radiating arms may also differ from one another in order to respond to individual requirements of function and context.

放射式的臂膀也可能彼此不同，以适应功能或环境的特殊要求。

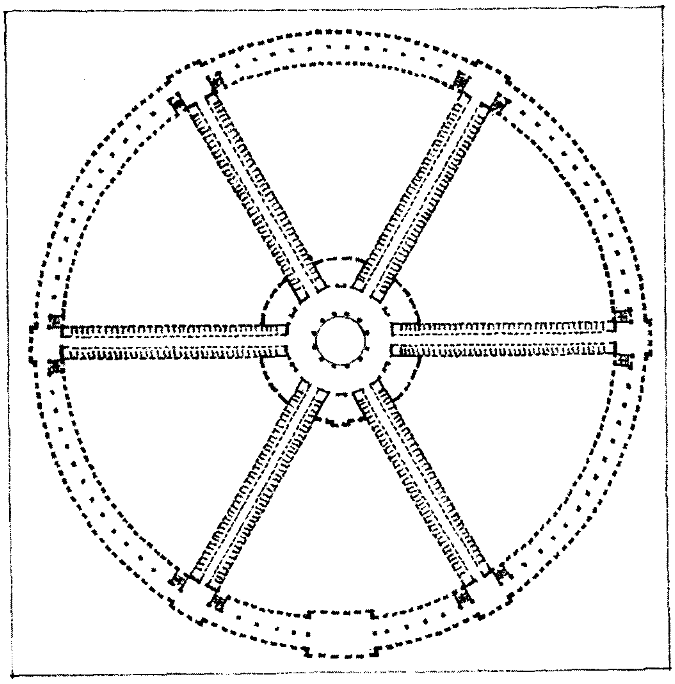
A specific variation of a radial organization is the pinwheel pattern wherein the linear arms of the organization extend from the sides of a square or rectangular central space. This arrangement results in a dynamic pattern that visually suggests a rotational movement about the central space.

放射式组合的一个特殊变体是风车模式，这类组合的线式臂膀从正方形或矩形中心空间的各边向外伸展。这种布局形成一个充满动感的图案，具有围绕中心空间旋转运动的视觉倾向。



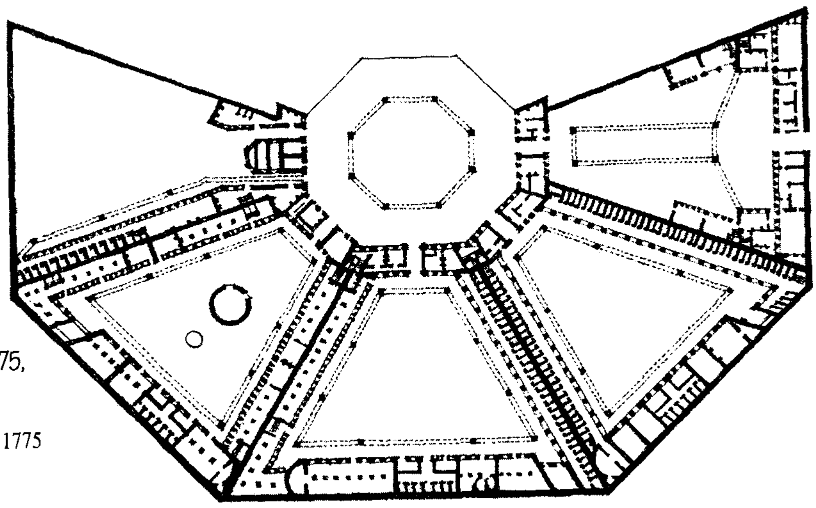
Moabit Prison, Berlin, 1869–1879, Herrman

莫阿比特监狱，柏林，1869年—1879年，赫尔曼



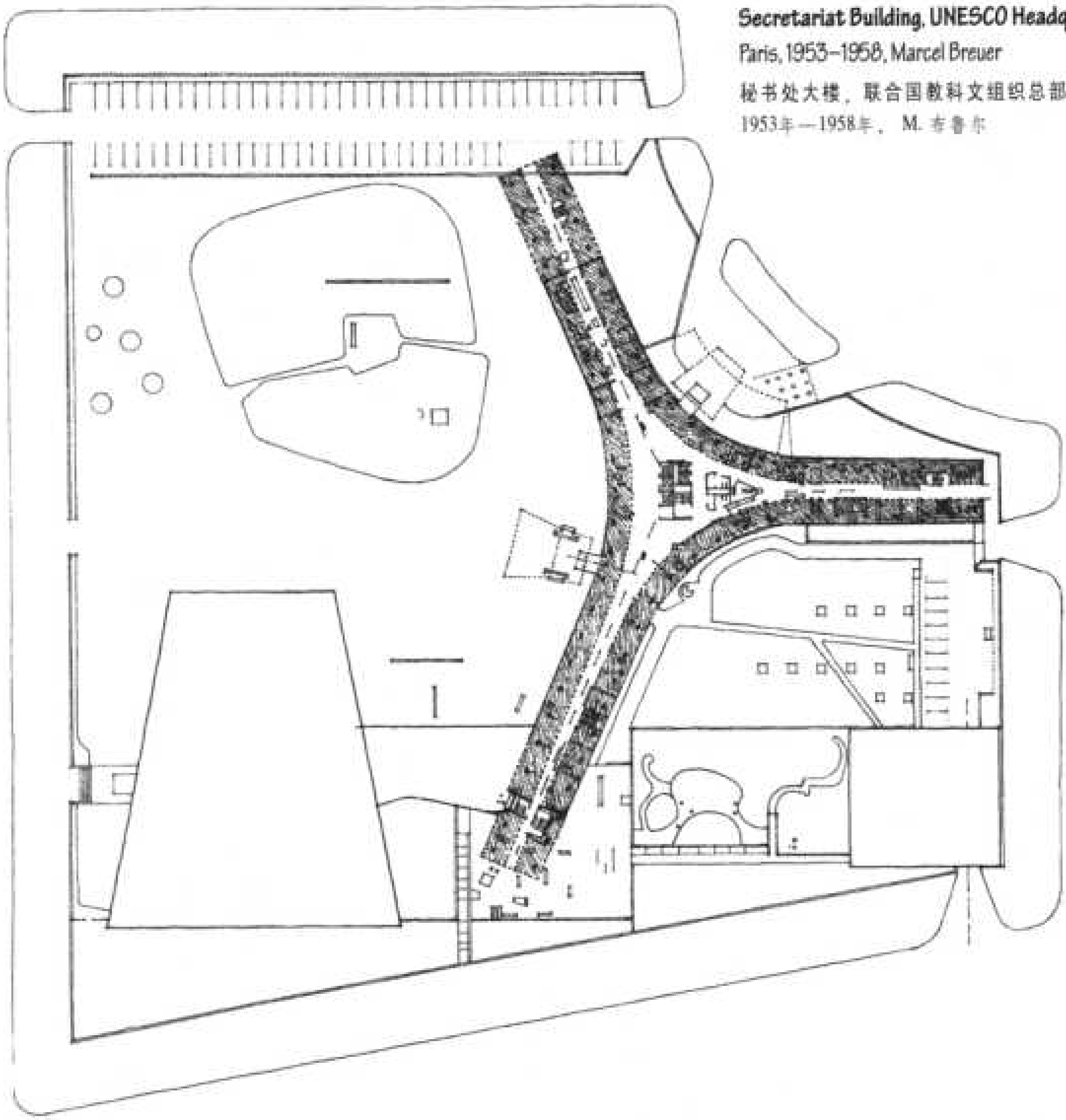
Hôtel Dieu (Hospital), 1774, Antoine Petit

霍太尔·迪厄（医院），1774年， A.彼特



Maison de Force (Prison), Ackerghem near Ghent, Belgium, 1772–1775, Malfaison and Kluchman

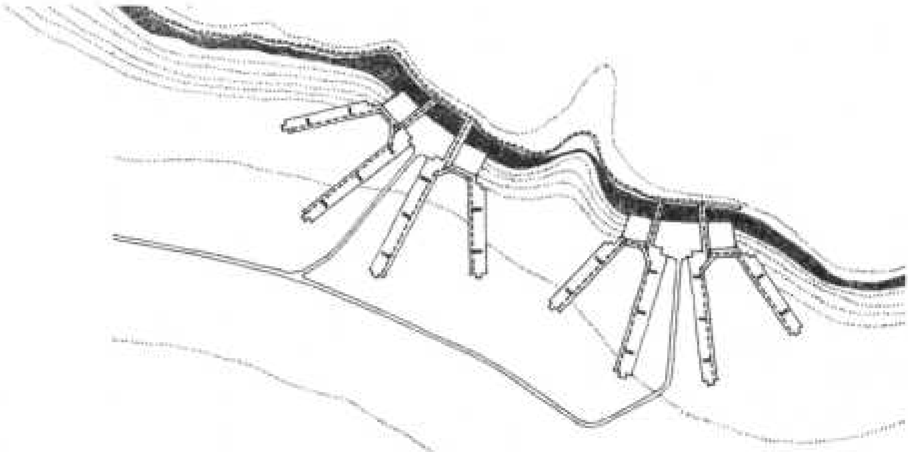
戴弗斯大楼（监狱），根特附近的阿克姆，比利时，1772年—1775年， 马尔费森与克拉克曼



Secretariat Building, UNESCO Headquarters, Place de Fontenoy, Paris, 1953–1958, Marcel Breuer

秘书处大楼，联合国教科文组织总部，福特诺依广场，巴黎，1953年—1958年，M. 布鲁尔

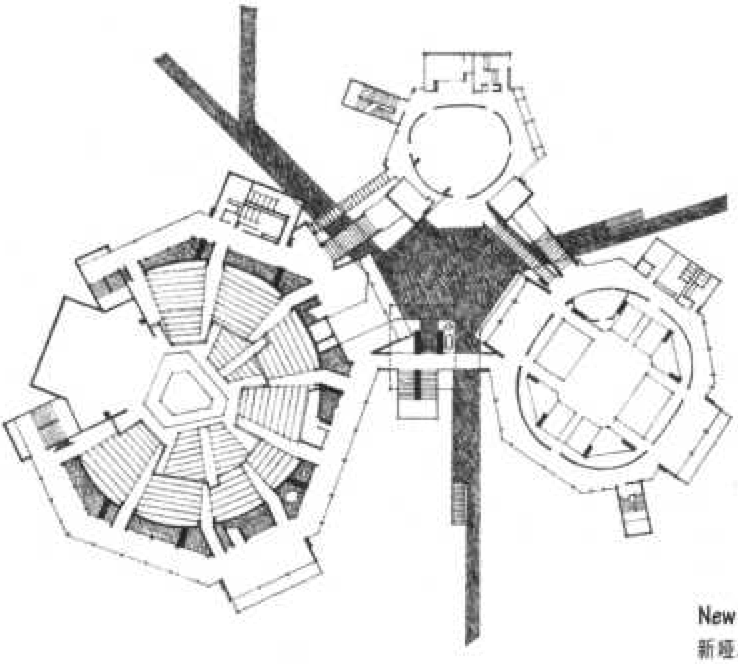
Site Plan
场地平面



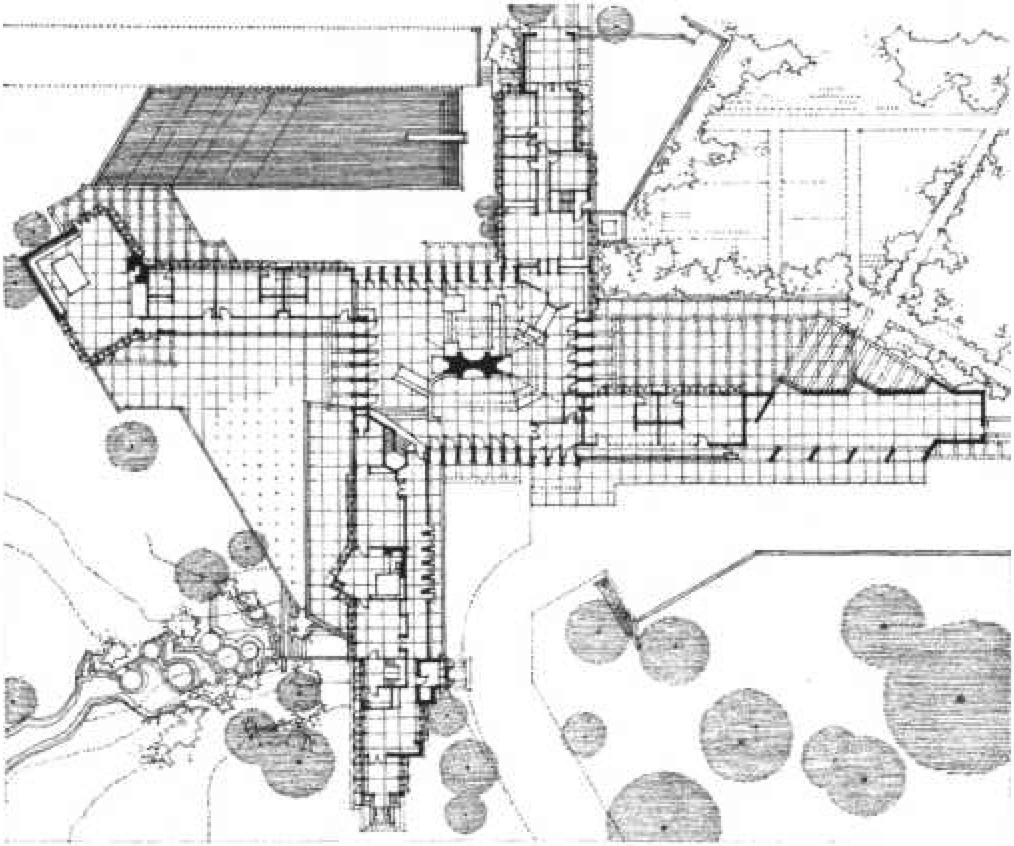
Residential Expansion, St. Andrews University, Scotland, 1964–1968, James Stirling
住宅区扩建，圣安德鲁斯大学，苏格兰，1964年—1968年，J.斯特林

Typical Unit
典型单元

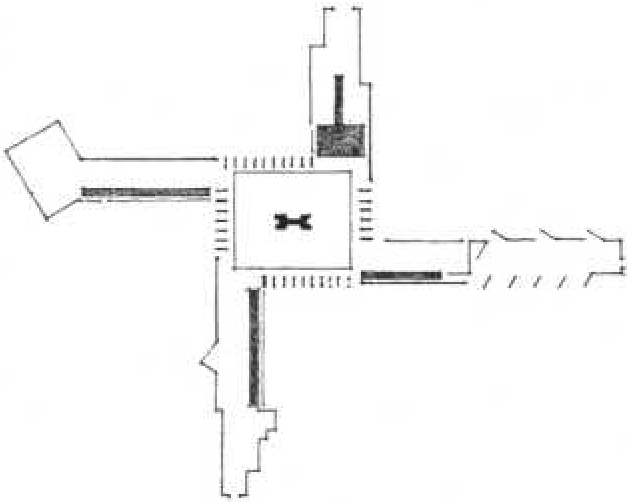


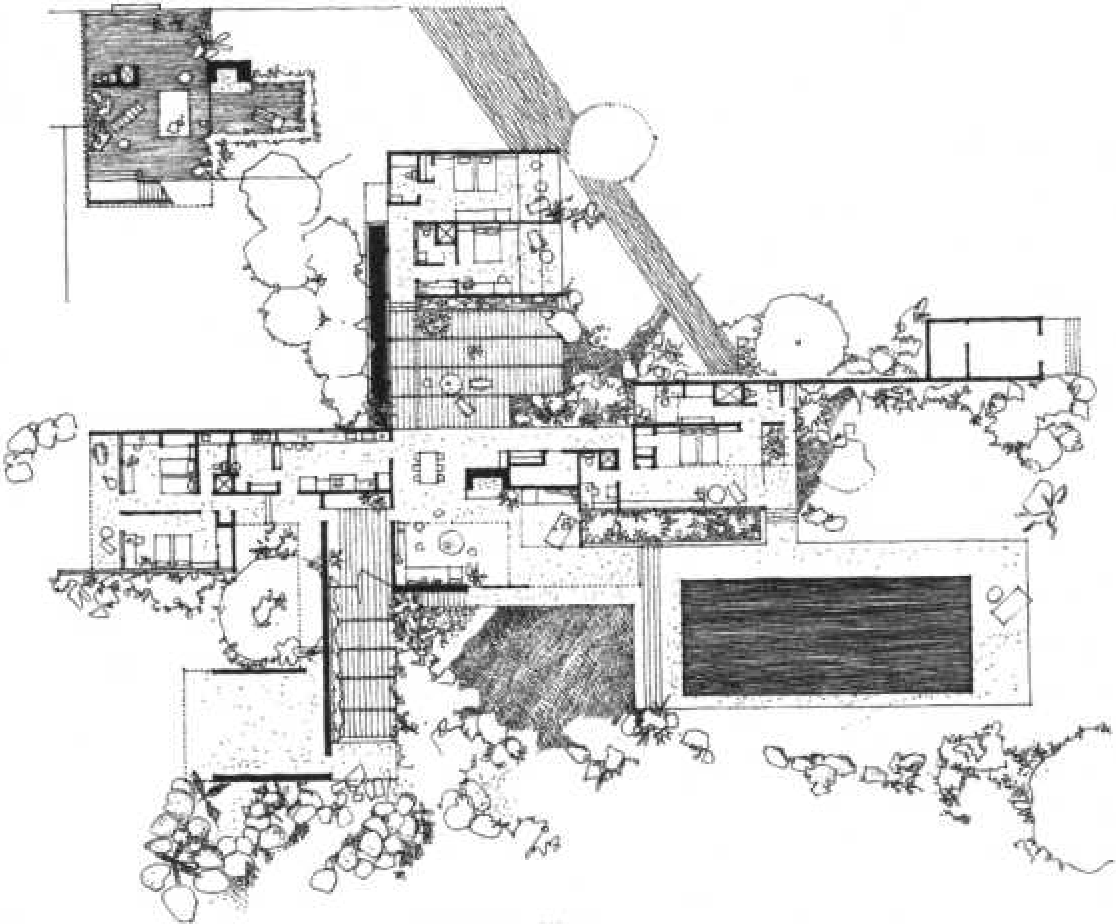


New Mummers Theater, Oklahoma City, Oklahoma, 1970, John M. Johansen
新哑剧剧院，俄克拉荷马，1970年，J.M.约翰森

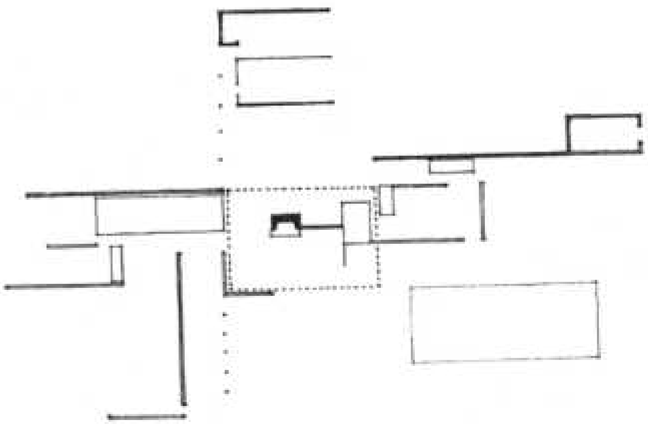


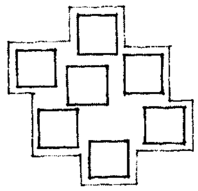
Herbert F. Johnson House (Wingspread), Wind Point, Wisconsin, 1937, Frank Lloyd Wright
H. F. 约翰逊住宅（展翼住宅），温波恩特，威斯康星州，1937年，F. L. 莱特



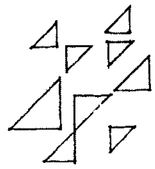


Kaufmann Desert House, Palm Springs, California, 1946, Richard Neutra
考夫曼沙漠别墅，帕姆斯普林，加利福尼亚洲，1946年，R.纽特拉

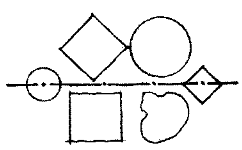




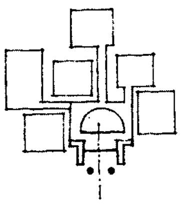
Repetitive spaces
重复的空间



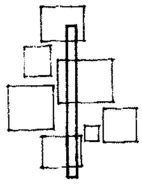
Sharing a common shape
具有相同形状



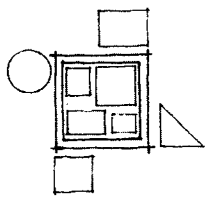
Organized by an axis
以轴线来组合



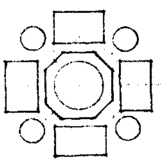
Clustered about an entry
围绕入口来组合



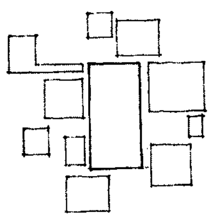
Grouped along a path
沿通道组合



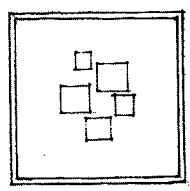
A loop path
以环形通道来组合



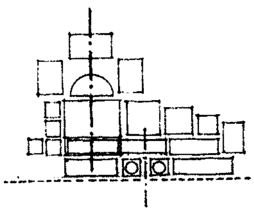
Centralized pattern
集中式图案



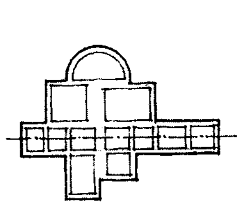
Clustered pattern
组团式图案



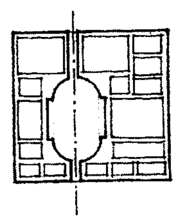
Contained within a space
包容于一个空间内



Axial conditions
有多条轴线的情形



Axial condition
有轴线的情形



Symmetrical condition
对称的情形

A clustered organization relies on physical proximity to relate its spaces to one another. It often consists of repetitive, cellular spaces that have similar functions and share a common visual trait such as shape or orientation. A clustered organization can also accept within its composition spaces that are dissimilar in size, form, and function, but related to one another by proximity or a visual ordering device such as symmetry or an axis. Because its pattern does not originate from a rigid geometrical concept, the form of a clustered organization is flexible and can accept growth and change readily without affecting its character.

组团式组合通过紧密连接来使各个空间之间互相联系，通常包括重复的、细胞状的空间，这些空间具有类似的功能并在形状和朝向方面具有共同的视觉特征。组团式空间组合也可以在它的构图中包容尺寸、形式和功能不同的空间，但这些空间要通过紧密连接，或者诸如对称、轴线等视觉秩序化手段来建立联系。因为组团式组合的图案，并不来源于某个固定的几何概念，因此它灵活可变，可随时增加和变换而不影响其特点。

Clustered spaces can be organized about a point of entry into a building or along the path of movement through it. The spaces can also be clustered about a large defined field or volume of space. This pattern is similar to that of a centralized organization, but it lacks the latter's compactness and geometrical regularity. The spaces of a clustered organization can also be contained within a defined field or volume of space.

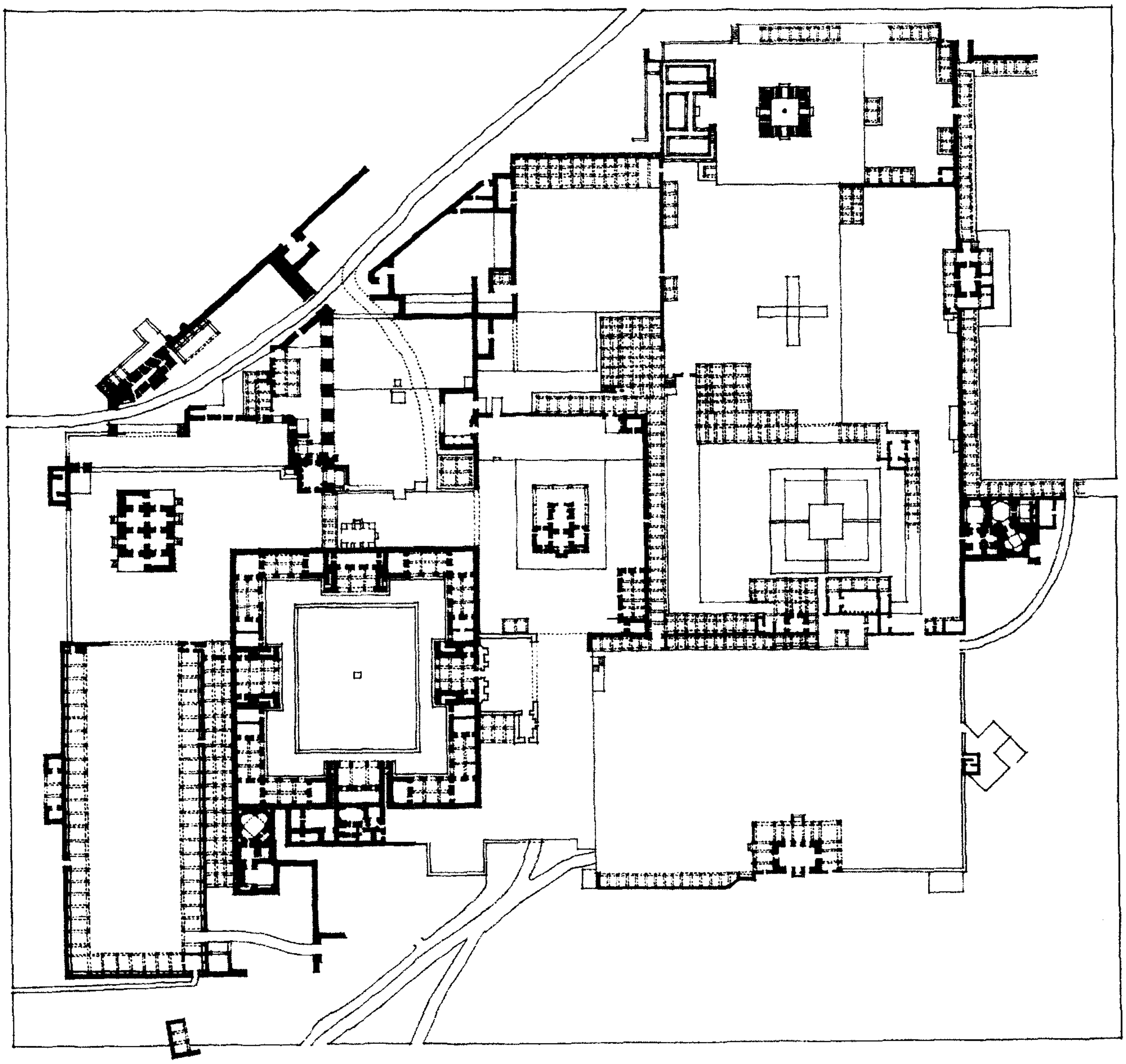
组团式组合可以围绕一个进入建筑物的入口点，或者沿着穿过建筑物的运动轨迹来组织空间。这些空间也可以成团地布置在一个大型的划定区域或空间容积的周围。这种图案类似于集中式组合，但缺乏后者的紧凑性和几何规整性。组团式组合中的各个空间，也可以被包容在一个指定的范围或空间容积之内。

Since there is no inherent place of importance within the pattern of a clustered organization, the significance of a space must be articulated by its size, form, or orientation within the pattern.

由于组团式组合的图形中没有固定的重要位置，因此必须通过图形中的尺寸、形式或者朝向，才能清楚地表现出某个空间所具有的重要意义。

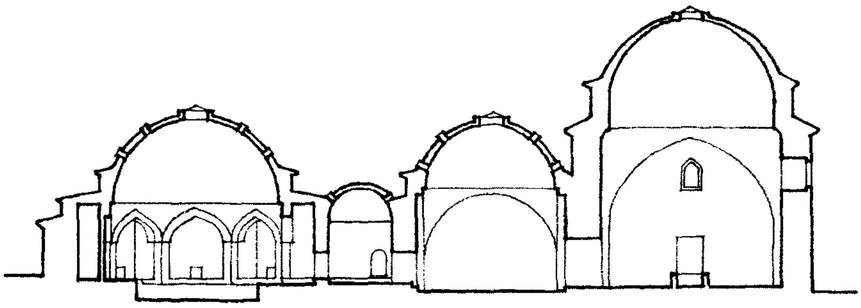
Symmetry or an axial condition can be used to strengthen and unify portions of a clustered organization and help articulate the importance of a space or group of spaces within the organization.

可以采用对称或轴线的方法来加强和统一组团式组合的各个局部，同时有助于清楚地表达在这类空间组合中某一空间或空间群的重要性。

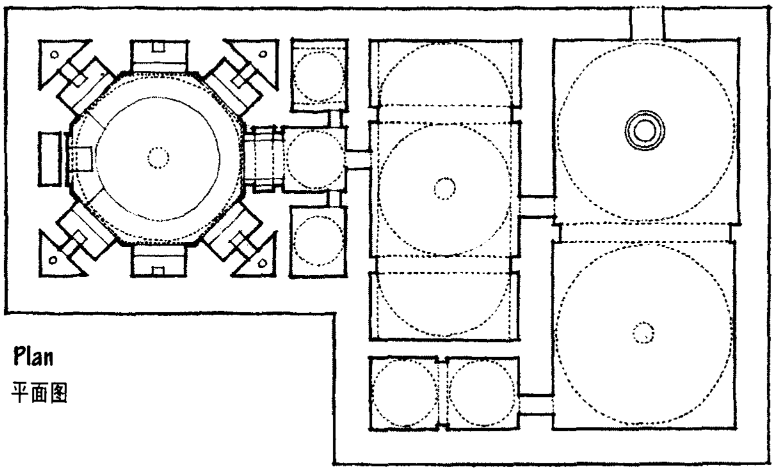


Fatehpur Sikri, Palace Complex of Akbar the Great Mogul Emperor of India, 1569–1574

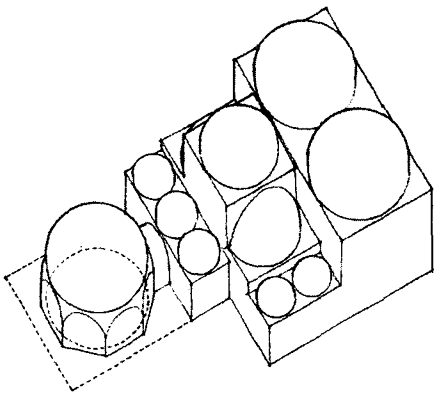
费特普·斯克里，印度莫卧儿大帝阿克巴的宫殿综合体，1569年—1574年



Section
剖面图

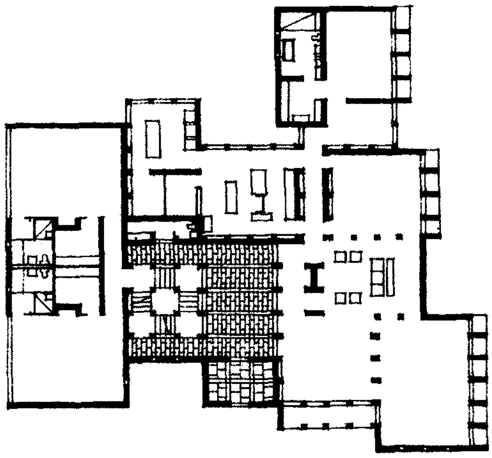


Plan
平面图

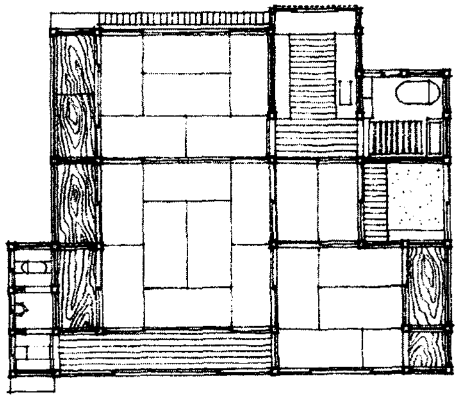


Axonometric
轴侧图

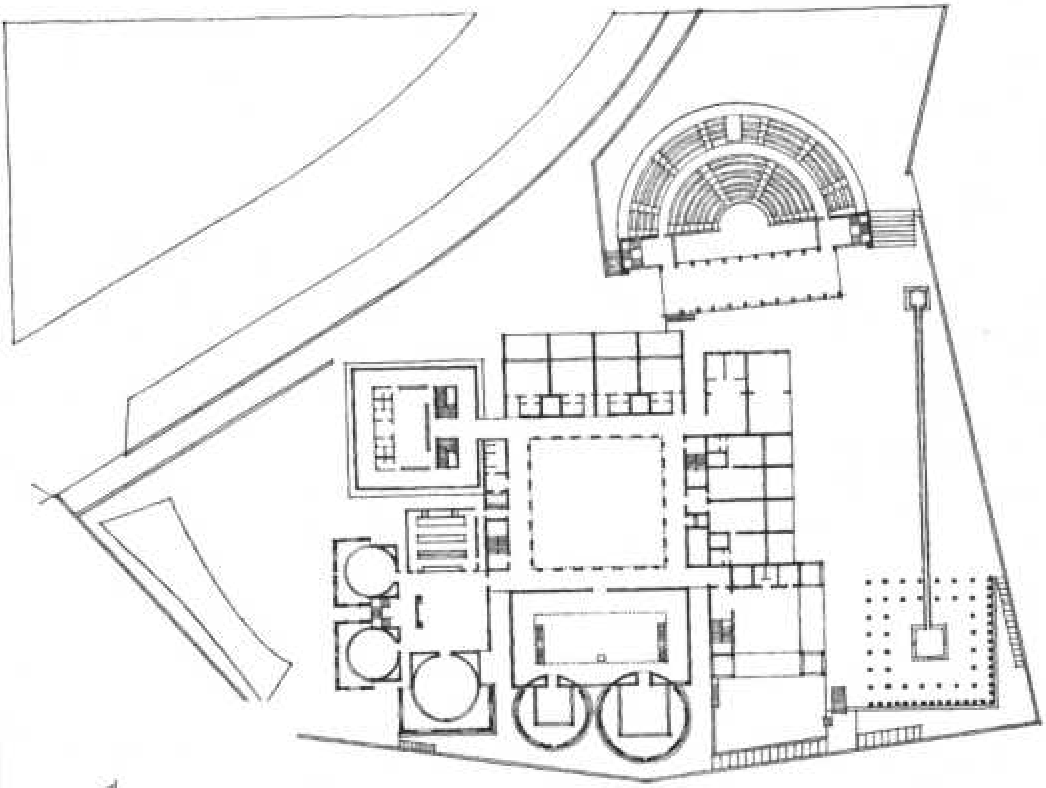
Yeni-Kaplica (Thermal Bath), Bursa, Turkey
叶尼-卡普里卡（温泉浴室），布尔萨，土耳其



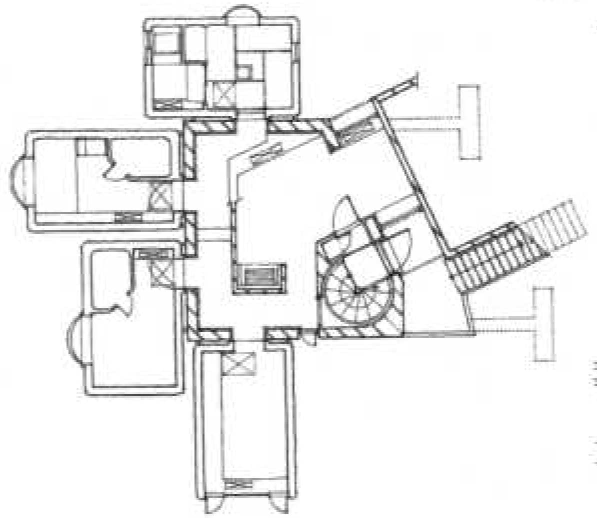
Morris House (Project), Mount Kisco, New York, 1958, Louis Kahn
莫里斯住宅（方案），蒙特奇索，纽约州，1958年，L. 康



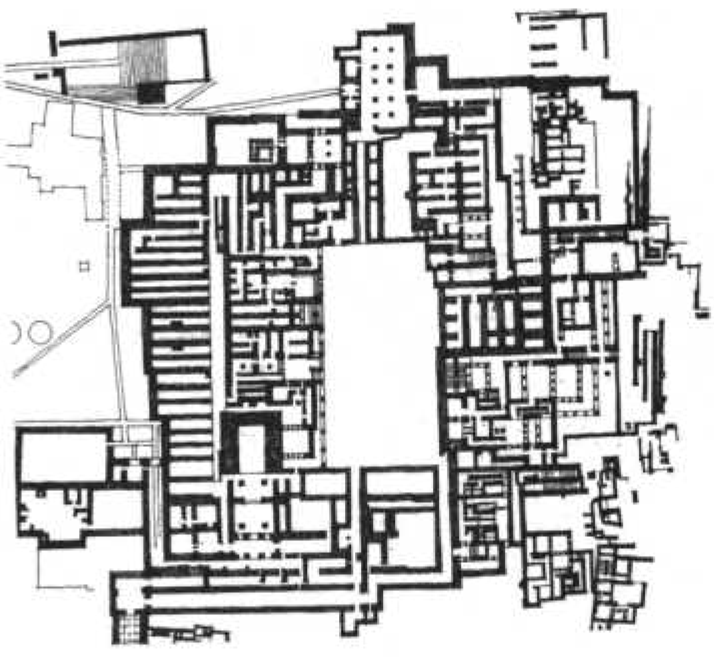
Traditional Japanese House
传统的日本住宅



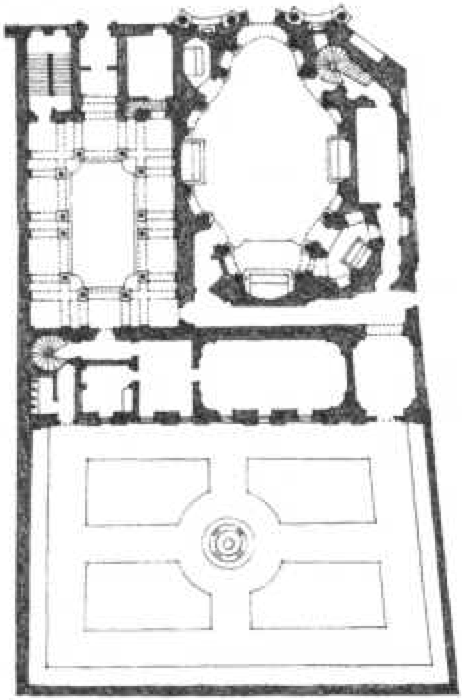
Meeting House, Salk Institute of Biological Studies, La Jolla, California, 1959–1965, Louis Kahn
会所，索尔克生物研究协会，拉霍亚，加利福尼亚州，1959年—1965年，L. 康



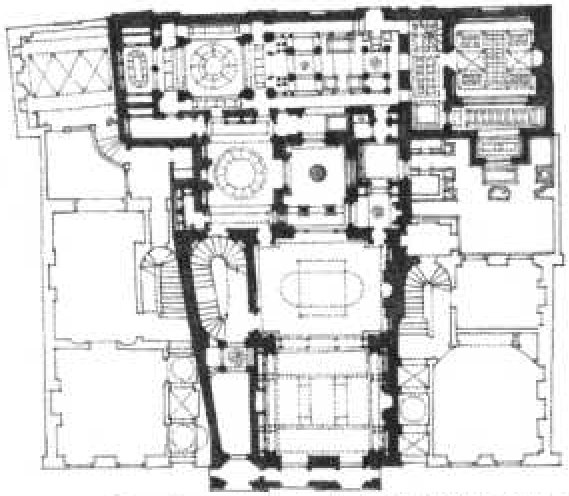
Karuizawa House, Country Retreat, 1974, Kisho Kurokawa
卡鲁扎瓦住宅，乡村居所，1974年，黑川纪章



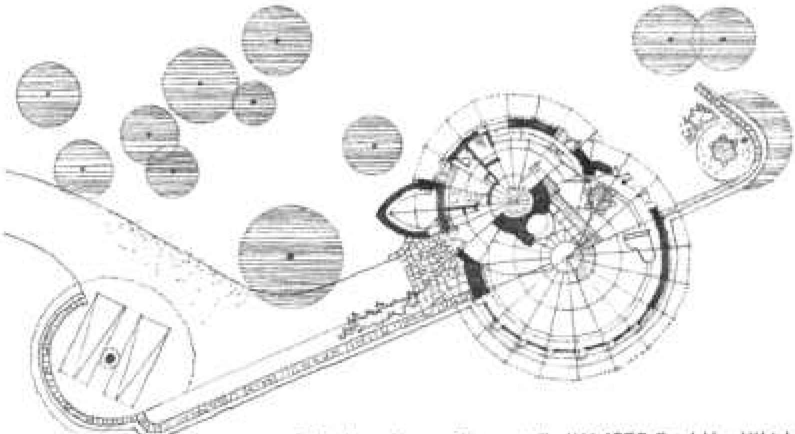
Palace of King Minos, Knossos, Crete, c. 1500 B.C.
迈诺斯王宫，克诺索斯，克里特岛，公元前1500年



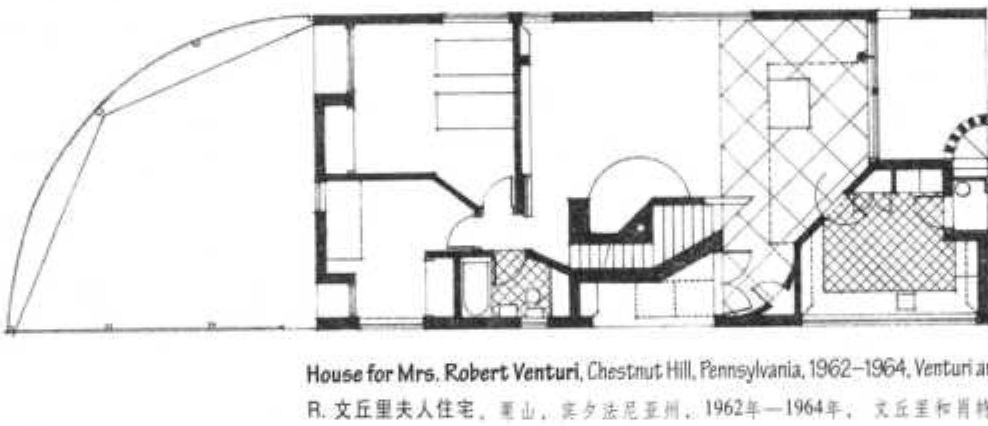
S. Carlo alle Quattro Fontane, Rome, 1633–1641, Francesco Borromini
圣卡洛四泉源教堂，罗马，1633年—1641年，F.博洛米尼



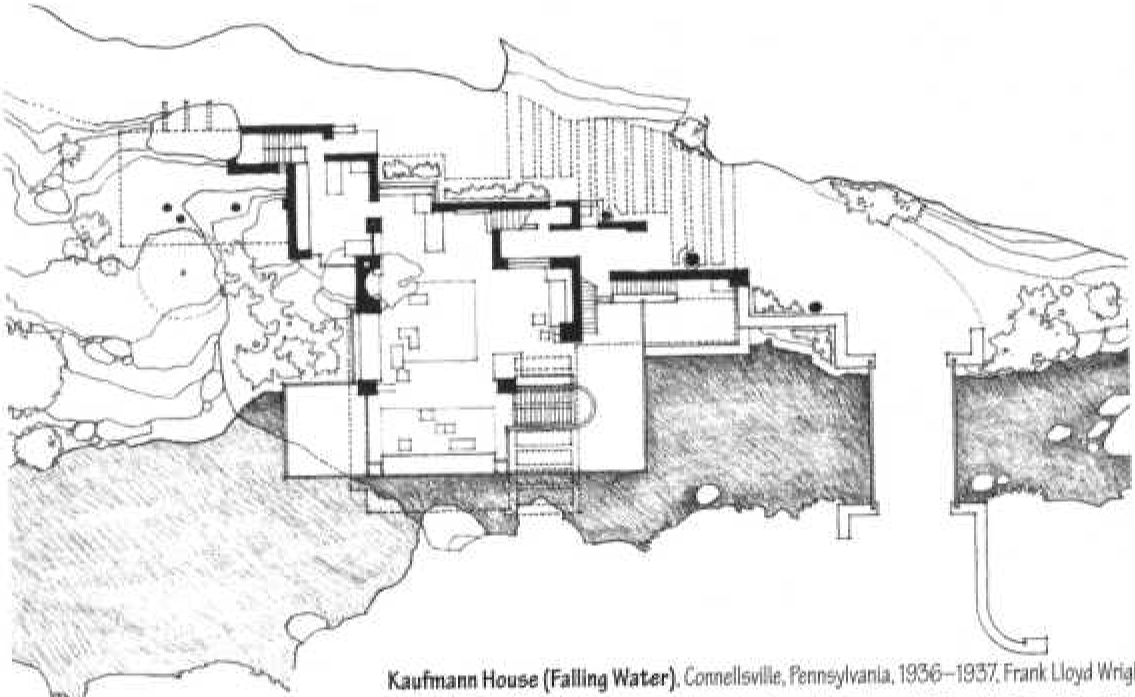
Soane House, London, England, 1812–1834, Sir John Soar
索恩府邸，伦敦，英格兰，1812年—1834年，J.索恩爵士



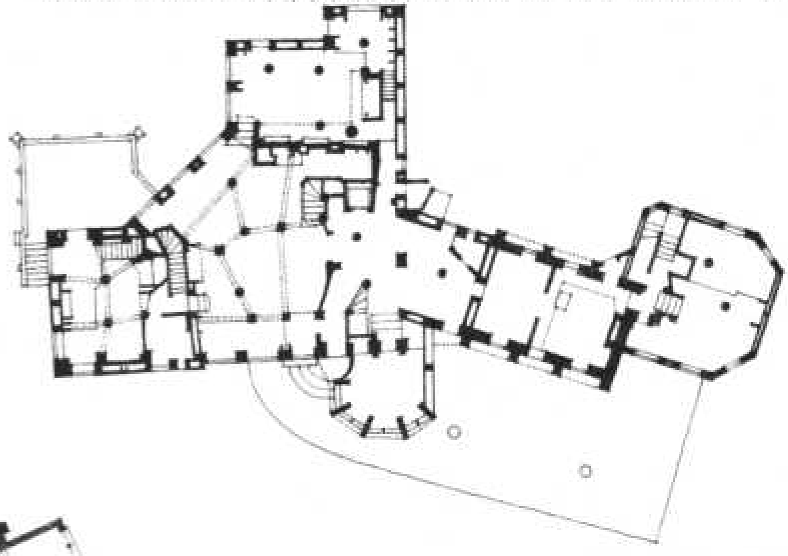
Friedman House, Pleasantville, N.Y., 1950, Frank Lloyd Wright
弗里德曼住宅，普莱森特维尔，纽约，1950年，F.L.莱特



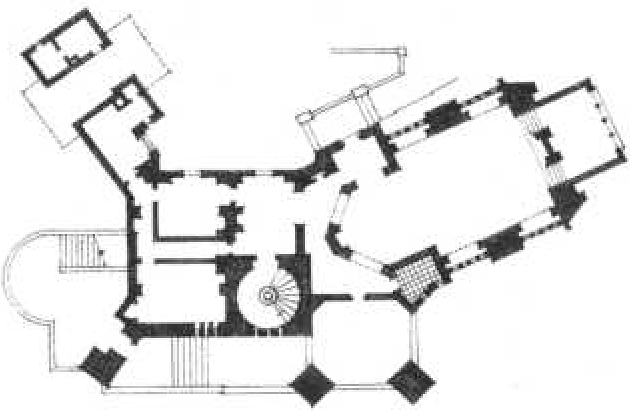
House for Mrs. Robert Venturi, Chestnut Hill, Pennsylvania, 1962–1964, Venturi and Sho
R.文丘里夫人住宅，栗山，宾夕法尼亚州，1962年—1964年，文丘里和肖特



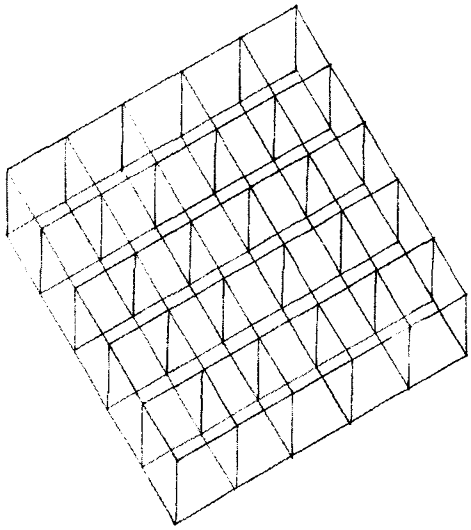
Kaufmann House (Falling Water), Connellsville, Pennsylvania, 1936–1937, Frank Lloyd Wright
考夫曼住宅（流水别墅），康奈尔斯维尔，宾夕法尼亚州，1936年—1937年，F.L.莱特



Mercer's Castle (Fonthill), Doylestown, Pennsylvania, 1908–1910, Henry Mercer
默塞尔城堡（圣泉山），多勒斯市，宾夕法尼亚州，1908年—1910年，H.默塞尔

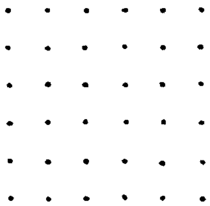


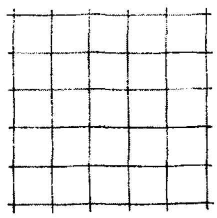
Wyntoon, Country Estate for the Hearst Family in northern California, 1903, Bernard Maybeck
温通庄园，赫斯特家族的乡村房产，加利福尼亚州北部，1903年，B.梅贝克

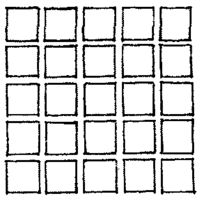


A grid organization consists of forms and spaces whose positions in space and relationships with one another are regulated by a three-dimensional grid pattern or field.

网格式组合由这样的形式和空间所组成：它们的空间位置和相互关系受控于一个三度网格图案或三度网格区域。

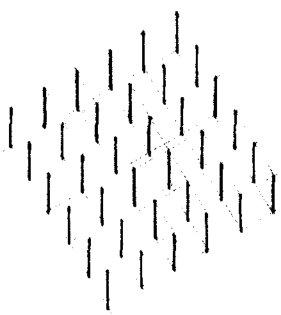


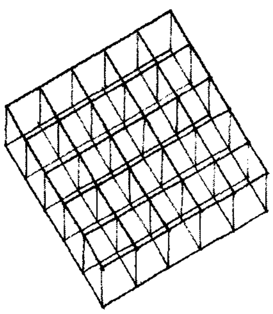


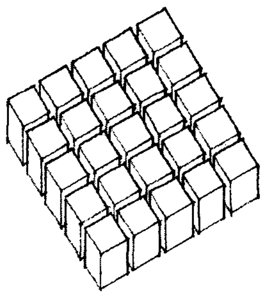


A grid is created by two, usually perpendicular, sets of parallel lines which establish a regular pattern of points at their intersections. Projected into the third dimension, the grid pattern is transformed into a set of repetitive, modular units of space.

网格来自于两套平行线相交，这两套平行线通常是垂直的，在它们的交点处形成了一个由点构成的图案。网格图案投影到第三量度，就变成一系列重复的模数化的空间单元。





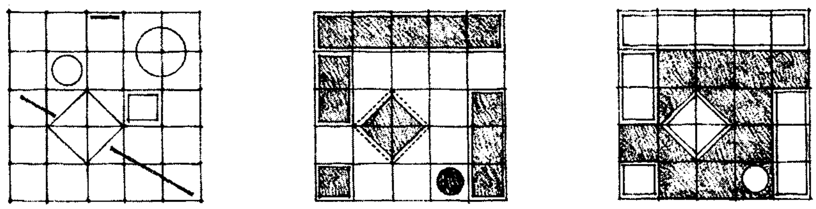


The organizing power of a grid results from the regularity and continuity of its pattern that pervades the elements it organizes. Its pattern establishes a stable set or field of reference points and lines in space with which the spaces of a grid organization, although dissimilar in size, form, or function, can share a common relationship.

网格的组合力来自于图形的规整性和连续性，它们渗透在所有的组合要素中。由空间中的参考点和线形成的图形建立起一种稳定的位置或稳定的区域。通过这种图形，网格式空间组合享有了共同的关系，尽管其中要素的尺寸、形式或功能不同。

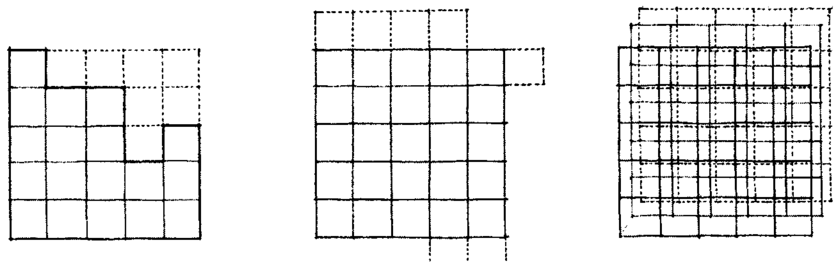
A grid is established in architecture most often by a skeletal structural system of columns and beams. Within the field of this grid, spaces can occur as isolated events or as repetitions of the grid module. Regardless of their disposition within the field, these spaces, if seen as positive forms, will create a second set of negative spaces.

建筑中的网格大多是通过梁与柱组成的框架结构体系形成的。在这一网格区域内，空间既能以独立实体出现，也能以重复的网格模数单元出现。无论这些空间在该区域中如何布置，只要把它们看作“正”的形式，就会产生一些次要的“负”空间。



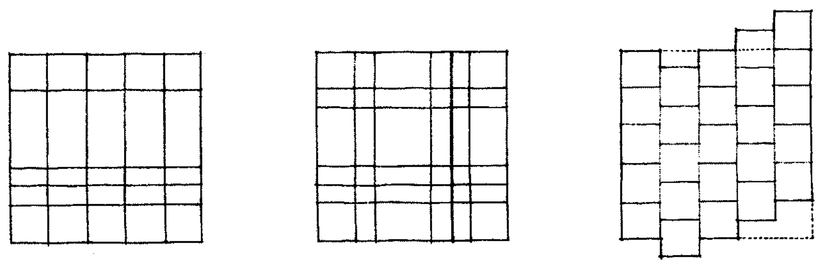
Since a three-dimensional grid consists of repetitive, modular units of space, it can be subtracted from, added to, or layered, and still maintain its identity as a grid with the ability to organize spaces. These formal manipulations can be used to adapt a grid form to its site, to define an entrance or outdoor space, or to allow for its growth and expansion.

由于三度网格是由重复的、模数化的空间单元组成的，它可以被削减、增加或层叠，而仍然保持其作为一个网格的可识别性，具有组合空间的能力。这些形式变化可以用来调整网格，使其形式与基地相适应；可以限定入口或室外空间，或者为其增长或扩大留下余地。



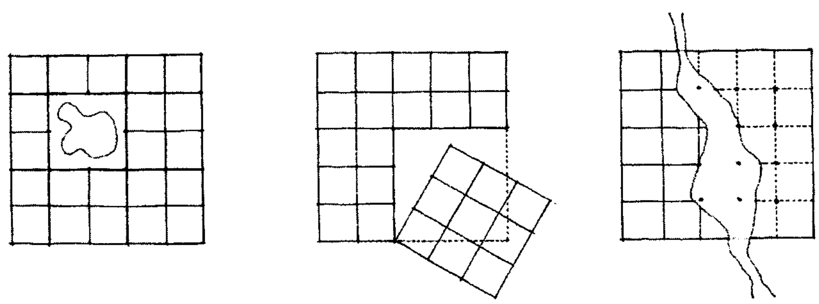
To accommodate the specific dimensional requirements of its spaces or to articulate zones of space for circulation or service, a grid can be made irregular in one or two directions. This dimensional transformation would create a hierarchical set of modules differentiated by size, proportion, and location.

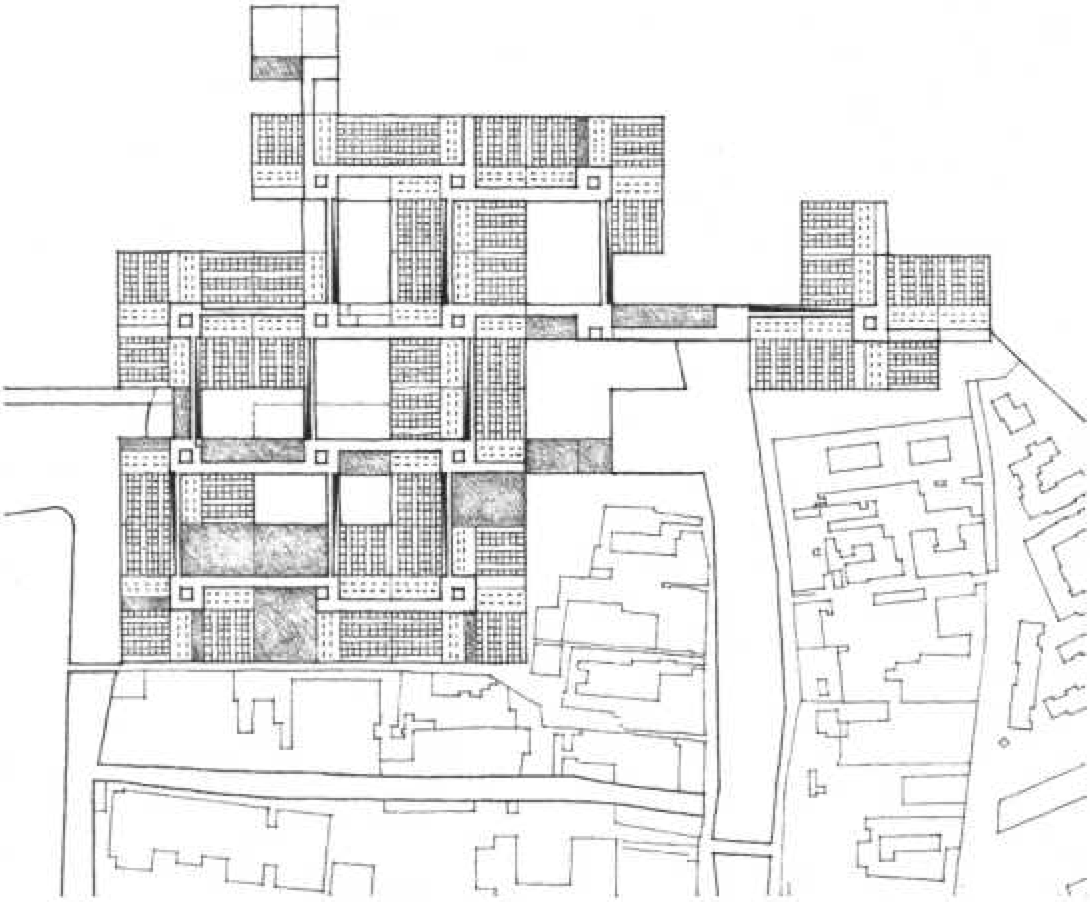
为了满足空间量度的特定要求，或者为了明确交通和服务等空间区域，网格可以在一个或两个方向上呈不规则形式。这种量度的改变将会产生一套等级化的模数，可以通过尺寸、比例和位置加以区分。



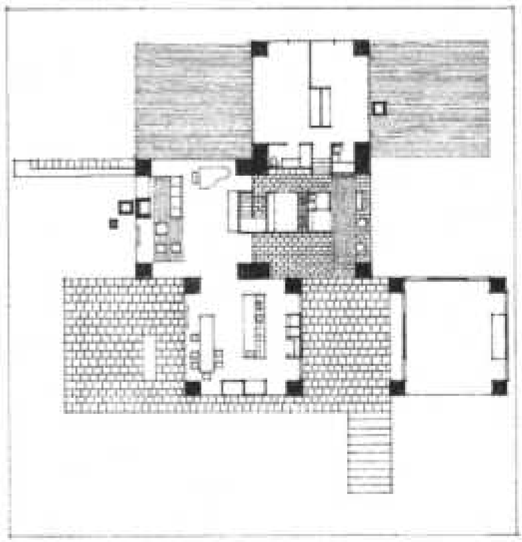
A grid can also undergo other transformations. Portions of the grid can slide to alter the visual and spatial continuity across its field. A grid pattern can be interrupted to define a major space or accommodate a natural feature of its site. A portion of the grid can be dislocated and rotated about a point in the basic pattern. Across its field, a grid can transform its image from a pattern of points to lines, to planes, and finally, to volumes.

网格也可以进行其他的变化。网格的某些部分可以滑动，以改变贯穿这一领域的视觉与空间连续性。网格形式还可以中断，划分出一个主体空间，或者适应场地的自然地貌。网格的一部分可以移位，并围绕基本图形上的一点转动。从网格所在区域的一边到另一边，网格的形象可以不断发生改变，从点到线到面，最后变成体。

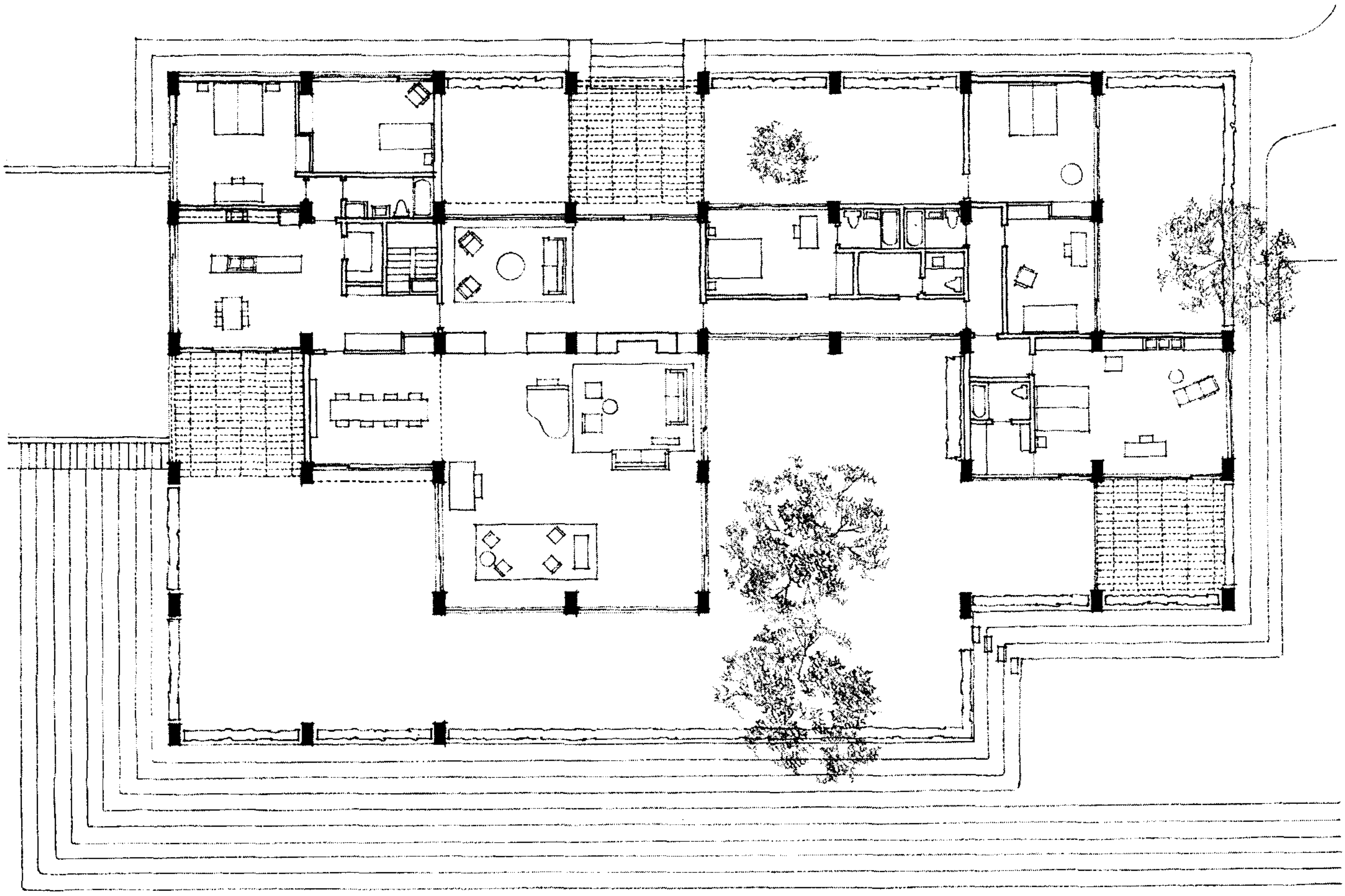




Hospital Project, Venice, 1964–1966, Le Corbusier
医院方案，威尼斯，1964年—1966年，勒·柯布西埃

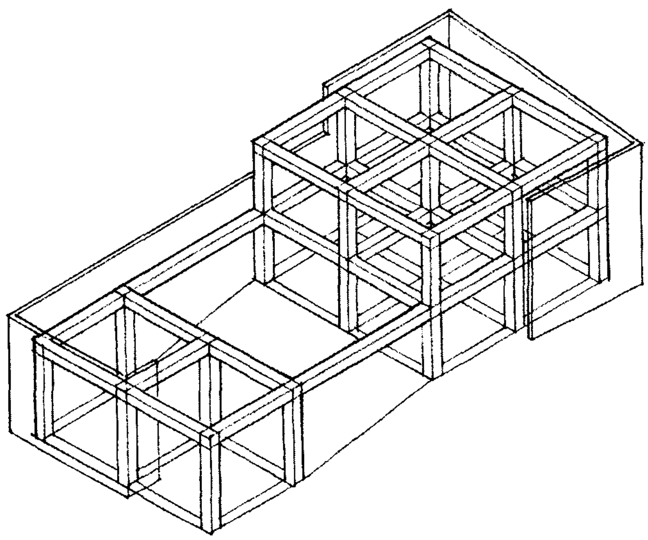


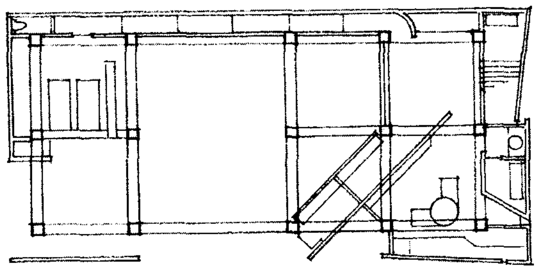
Adler House (Project), Philadelphia, Pennsylvania, 1954, Louis Kahn
艾德勒住宅（方案），费城，宾夕法尼亚州，1954年，L.康



Eric Boissonas House I, New Canaan, Connecticut, 1956, Philip Johnson

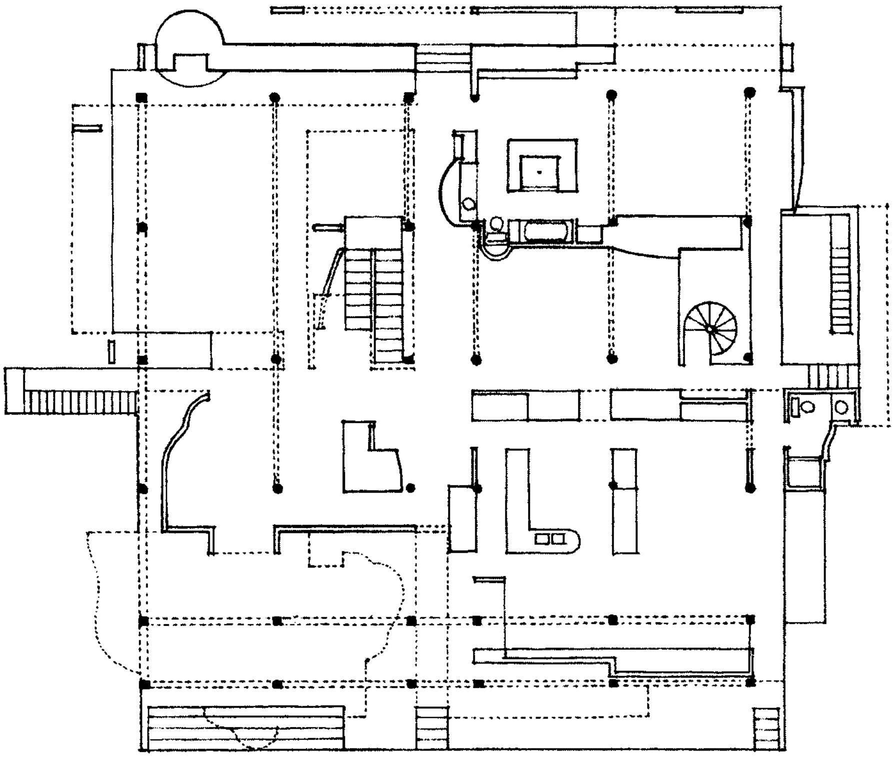
E. 勃逊纳斯一号住宅、新迦南，康涅狄格州，1956年， P. 约翰逊



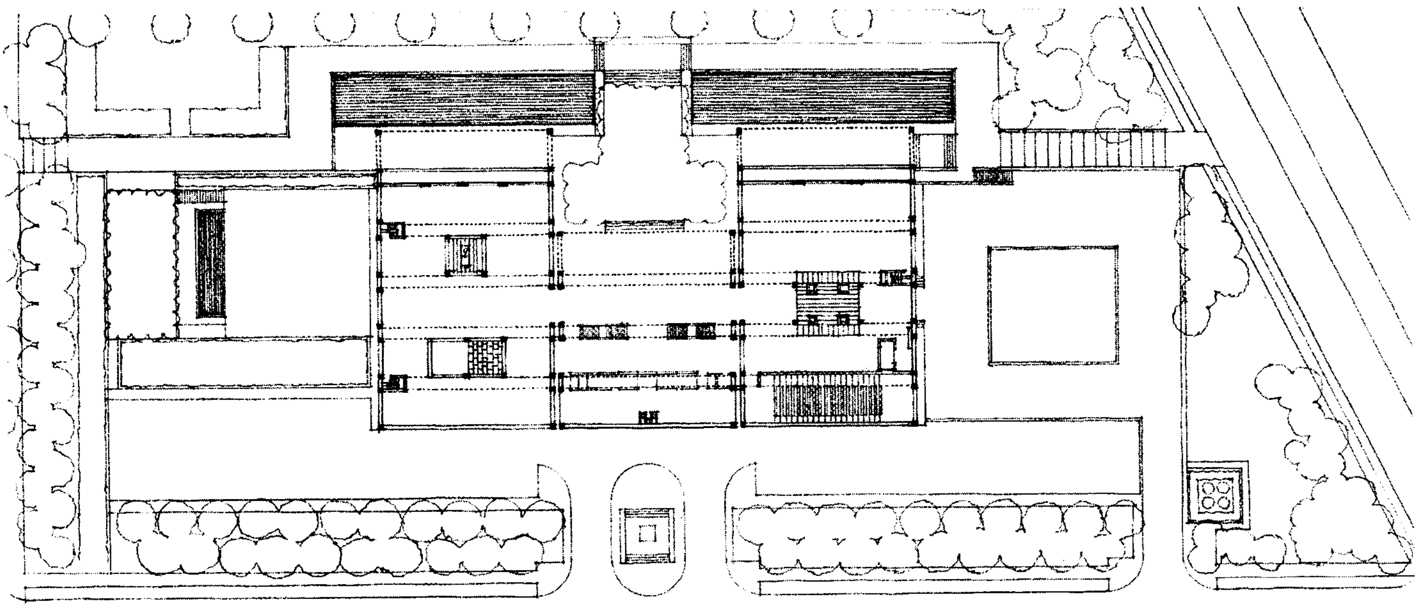


Manabe Residence, Tezukayama, Osaka, Japan, 1976–1977, Tadao Ando

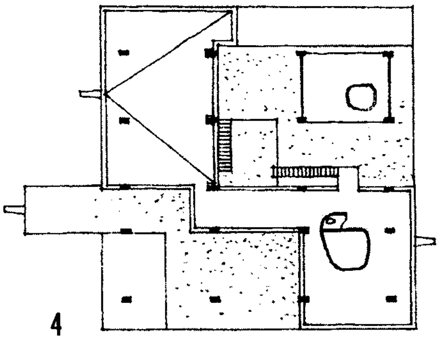
麦纳波住宅，特族卡山，大阪，日本，1976年—1977年， 安滕忠雄

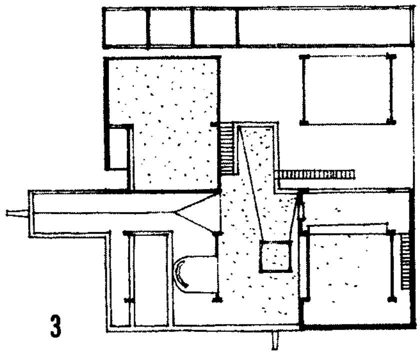


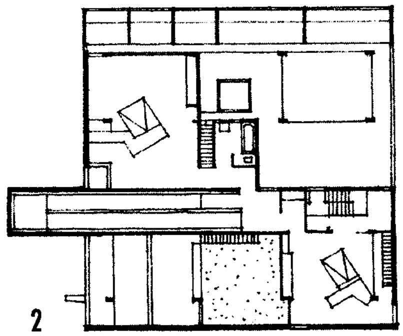
Snyderman House, Fort Wayne, Indiana, 1972, Michael Graves
施得门住宅，韦恩堡，印第安纳州，1972年， M.格雷夫斯

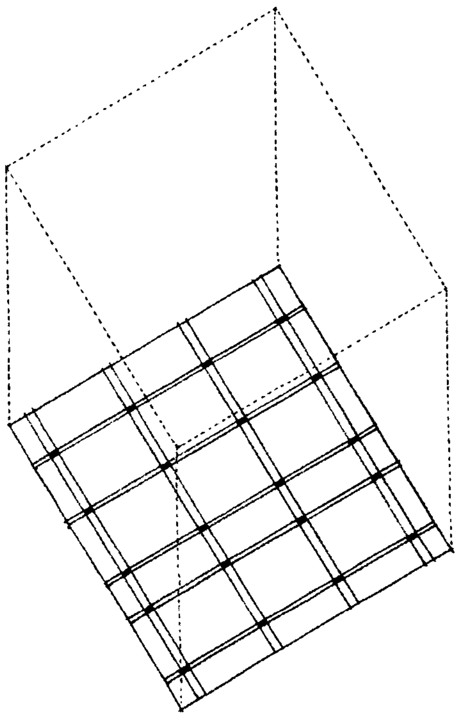


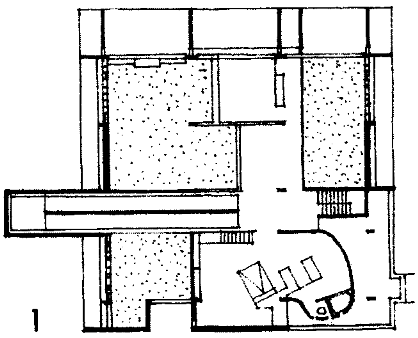
Kimball Art Museum, Forth Worth, Texas, 1967–1972, Louis Kahn
坎贝尔艺术博物馆，沃思堡，得克萨斯州，1967年—1972年， L.康

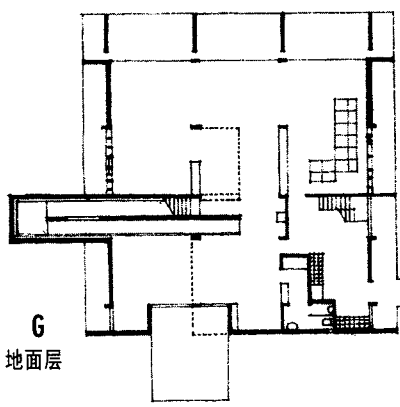

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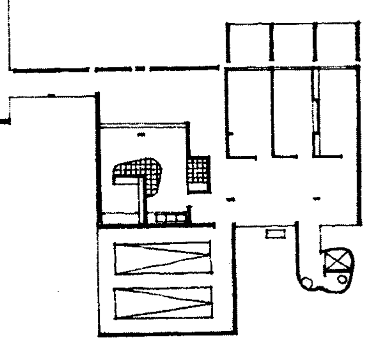

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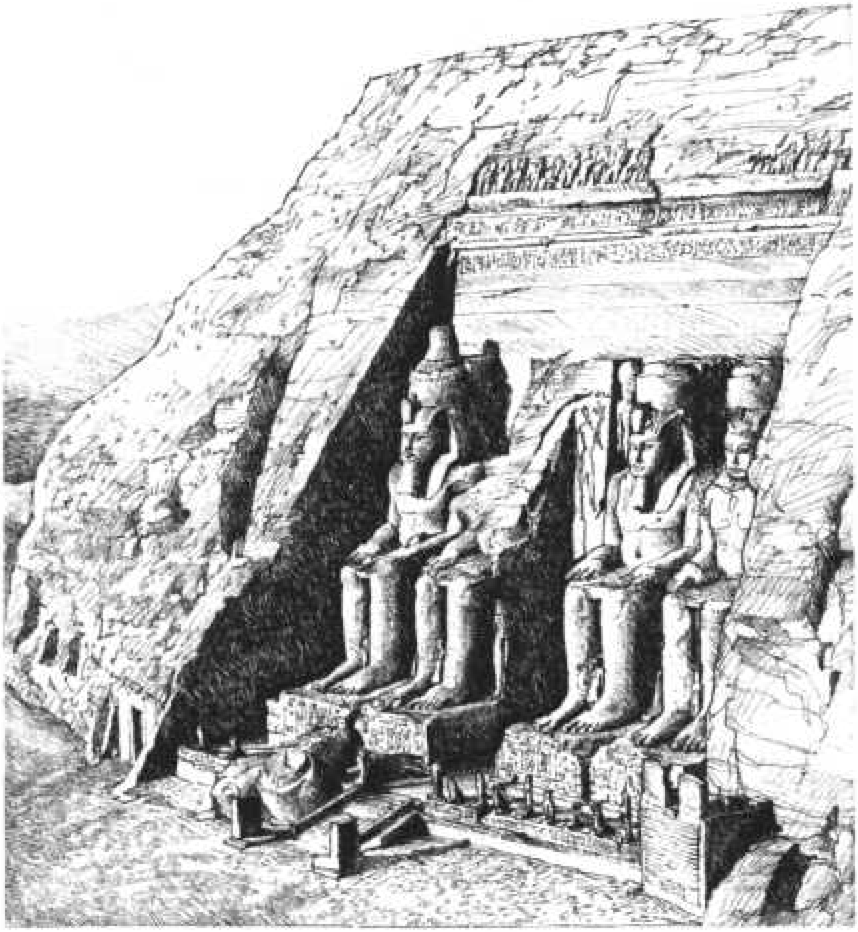


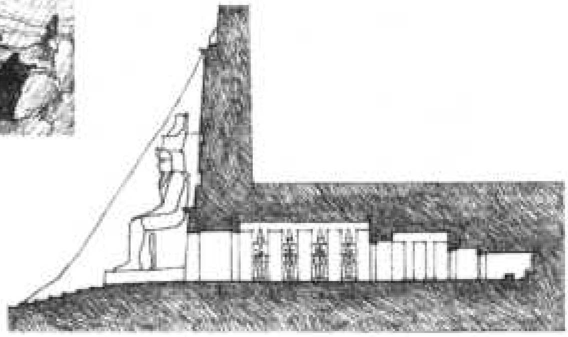

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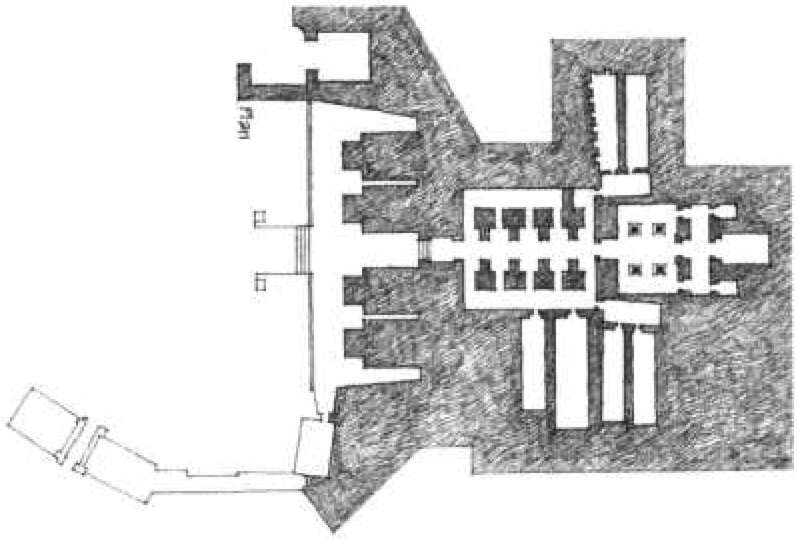

G
地面层



Shodhan House, Ahmedabad, India, 1956, Le Corbusier
舒德汉住宅，艾哈迈达巴德，印度，1956年，勒·柯布西埃







Great Temple of Rameses II, Abu Simbel, 1301–1235 B.C.

拉美西斯二世大神庙，阿布辛贝，公元前1301年—公元前1235年

5 交通
Circulation

"... we have been observing that the human body, which is our most fundamental three-dimensional possession, has not itself been a central concern in the understanding of architectural form; that architecture, to the extent that it is considered an art, is characterized in its design stages as an abstract visual art and not as a body-centered art ... We believe that the most essential and memorable sense of three-dimensionality originates in the body experience and that this sense may constitute a basis for understanding spatial feeling in our experience of buildings.

...The interplay between the world of our bodies and the world of our dwelling places is always in flux. We make places that are an expression of our haptic experiences even as these experience are generated by the places we have already created. Whether we are conscious or innocent of this process, our bodies and our movement are in constant dialogue with our buildings."

Charles Moore and Robert Yudell
Body, Memory, and Architecture
1977

"……我们已经注意到，人体是我们最基本的三度财富，然而在理解建筑形式方面，人体本身并不是中心焦点。建筑，在某种意义上被认为是一种艺术。在设计阶段，建筑就已经被赋予了抽象视觉艺术的特征，而不是作为一门以人体为中心的艺术……我们相信，三度空间所产生的最为本质、最令人难忘的感觉源自人的体验，并且这种感觉将构成我们在体验建筑过程中理解空间情感的基础。

"……我们人类的世界与我们的居住场所构成的世界，二者之间的相互作用总是不断变化的。我们制造的场所是我们曾经历过的感受的表达，即使这些感受来自我们已经建成的场所。在这一过程中，无论我们是自觉的还是无意识的，我们的身体以及我们的动作都在与建筑物进行着不停的对话。"

C. 穆尔和R. 玉戴尔
《人体、记忆与建筑》
1977年

The path of our movement can be conceived as the perceptual thread that links the spaces of a building, or any series of interior or exterior spaces, together.

运动的轨迹，可以看作是把建筑空间或室内及室外空间系列连接在一起的感性纽带。



Since we move in ***Time***
through a ***Sequence***
of ***Spaces***,

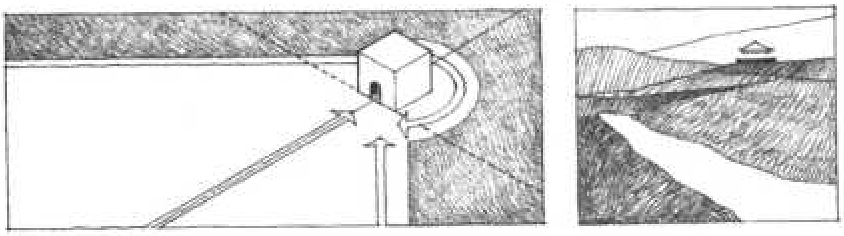
we experience a space in relation to where we've been and where we anticipate going. This chapter presents the principal components of a building's circulation system as positive elements that affect our perception of the forms and spaces of the building.

因为我们穿越**空间序列**运动于**时间**之中，
所以我们体验一个空间，与我们所处的位置及我们想去的地方有关。
本章呈现的是建筑交通系统的主要构成方式，并把它们看成是一些积极的要素，影响着我们对建筑形式和空间的感知。



Skylighted Concourse, Olivetti Headquarters,
Milton Keynes, 1971, James Stirling & Michael Wilford

开天窗的大厅，奥里维提总部，弥尔顿·凯因斯，1971年，J.斯特林与M.威尔福德

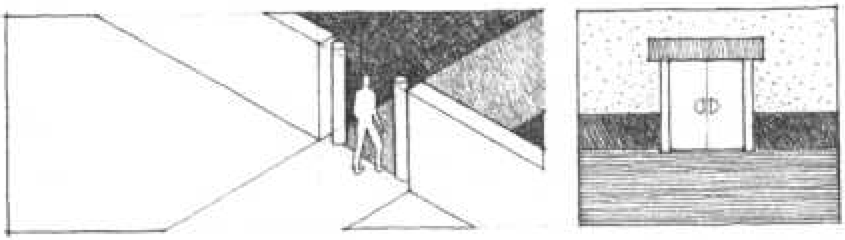


Approach

- The Distant View

通向建筑物的道路

- 远景

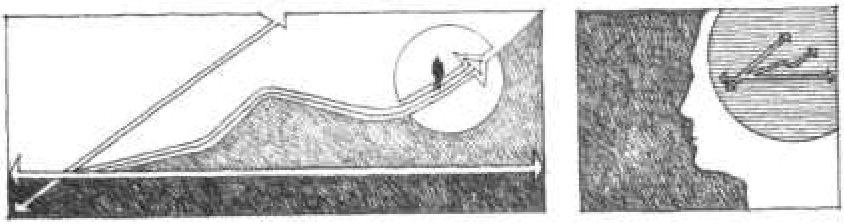


Entrance

- From Outside to Inside

建筑物的入口

- 从外到内

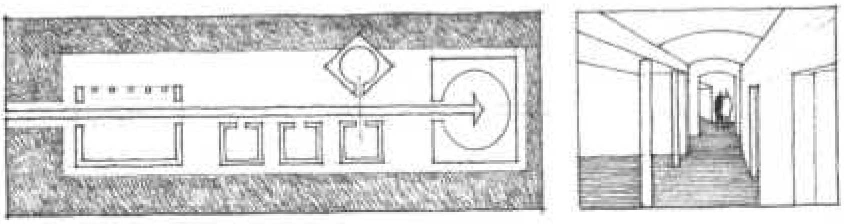


Configuration of the Path

- The Sequence of Spaces

路径的形状

- 空间序列

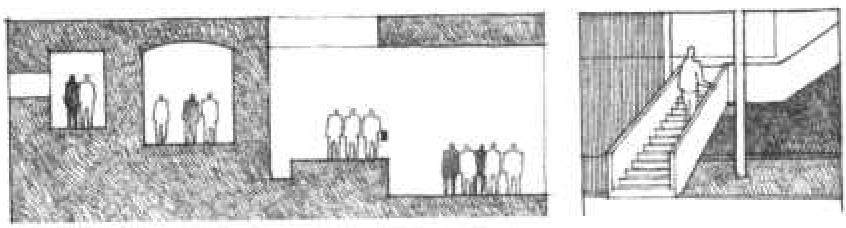


Path-space Relationships

- Edges, Nodes, and Terminations of the Path

路径与空间的关系

- 边缘、结点以及路径的终端

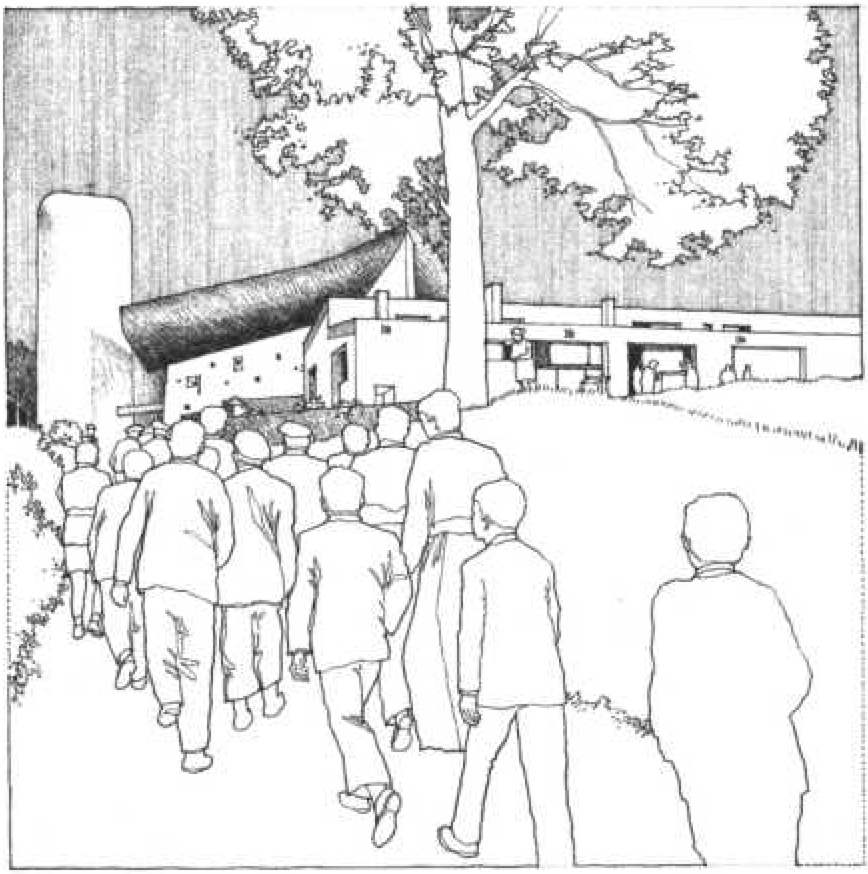


Form of the Circulation Space

- Corridors, Halls, Galleries, Stairways and Rooms

交通空间的形式

- 走廊、大厅、廊道、楼梯和房间



Approach to **Notre Dame Du Haut**, Ronchamp, France, 1950–1955, Le Corbusier

通向圣母教堂的道路，朗香，法国，1950年—1955年，勒·柯布西埃

Prior to actually passing into the interior of a building, we approach its entrance along a path. This is the first phase of the circulation system, during which we are prepared to see, experience, and use the spaces within a building.

在实际进入一个建筑内部之前，我们沿着一条通道走向建筑物的入口。这是交通系统的第一段，在这一阶段我们已经做好准备来观看、体验和使用建筑中的空间。

The approach to a building and its entrance may vary in duration from a few paces through a compressed space to a lengthy and circuitous route. It may be perpendicular to the primary facade of a building or be oblique to it. The nature of the approach may contrast with what is confronted at its termination, or it may be continued on into the building's interior sequence of spaces, obscuring the distinction between inside and outside.

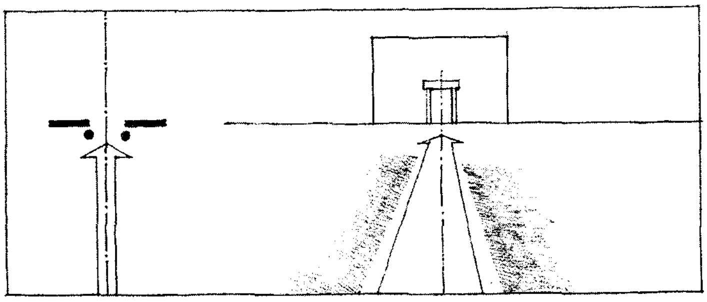
通向一栋建筑物及其入口的道路，从空间压缩后的几步路到漫长而曲折的路线，其过程可长可短。通道可以垂直于建筑物的主要立面，也可以与其呈一定角度。通道的特点可以与其终点所面临的状况形成对比，或者可以把通道的特点继续延伸到建筑物的室内空间序列，从而使建筑物的内外空间没有明显区别。

Frontal

A frontal approach leads directly to the entrance of a building along a straight, axial path. The visual goal that terminates the approach is clear; it may be the entire front facade of a building or an elaborated entrance within the plane.

正面式

正面式通道沿着笔直的轴向路径直接导向建筑物的入口。通道尽端的视觉目标是非常清楚的。它可能是建筑物的整个正立面，或者是立面上精心设计的入口。

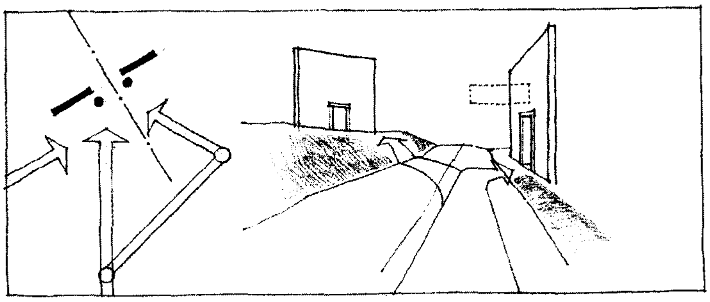


Oblique

An oblique approach enhances the effect of perspective on the front facade and form of a building. The path can be redirected one or more times to delay and prolong the sequence of the approach. If a building is approached at an extreme angle, its entrance can project beyond its facade to be more clearly visible.

倾斜式

斜向的通道增强了建筑物正立面与形体的透视效果。路径可以一次或几次地改变方向，以延缓并加长通道的序列。如果以一个极大的角度接近建筑物，建筑物的入口可以突出于正立面，以便一目了然。

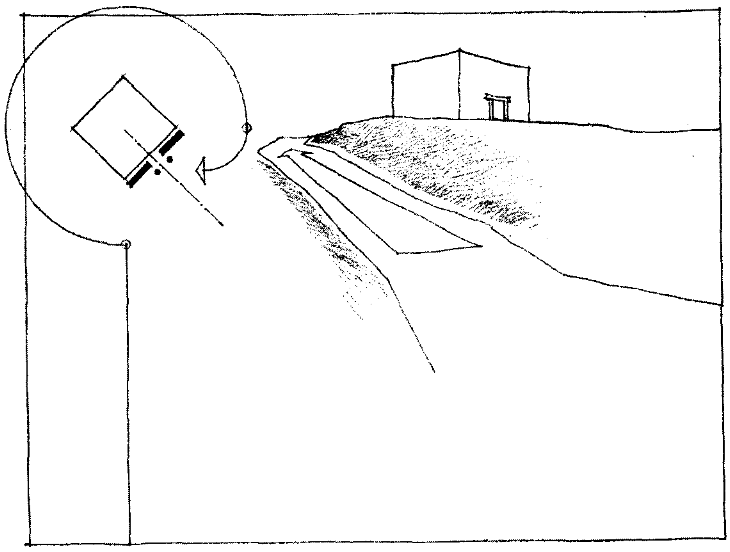


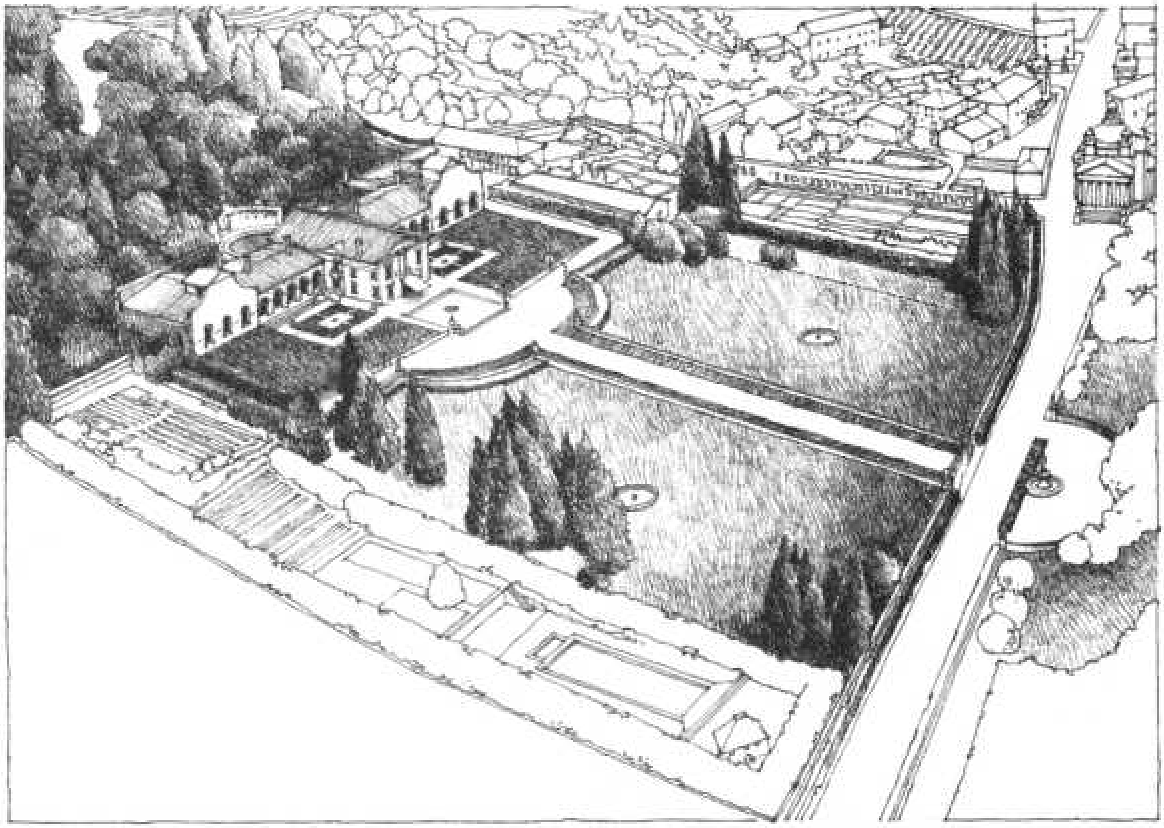
Spiral

A spiral path prolongs the sequence of the approach and emphasizes the three-dimensional form of a building as we move around its perimeter. The building entrance might be viewed intermittently during the approach to clarify its position or it may be hidden until the point of arrival.

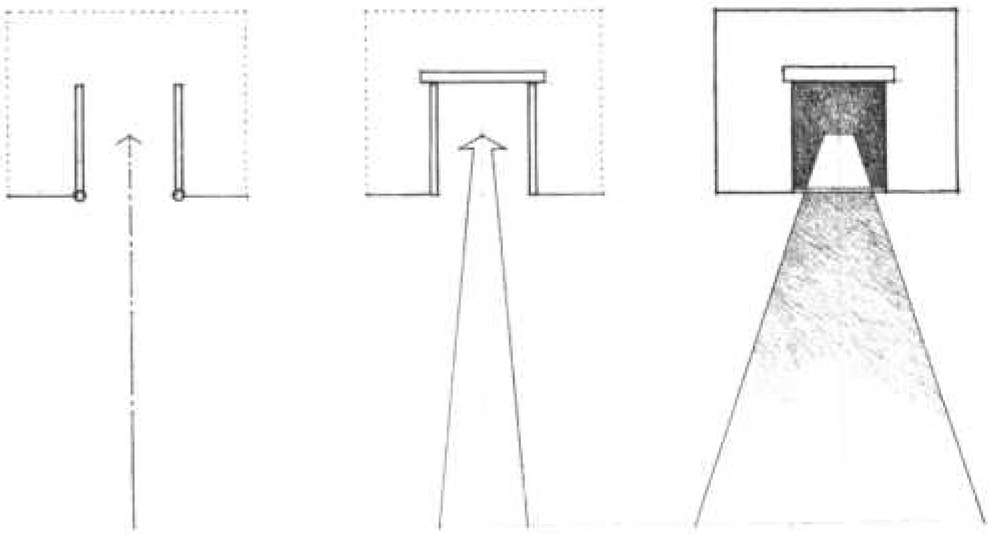
螺旋式

螺旋式路径延长了通道的序列，并且随着我们沿建筑物周边的运动，建筑物的三度形体得到加强。建筑物的入口可能会在行进过程中时隐时现，以表明其位置，也可以在最后到达时才突然出现。



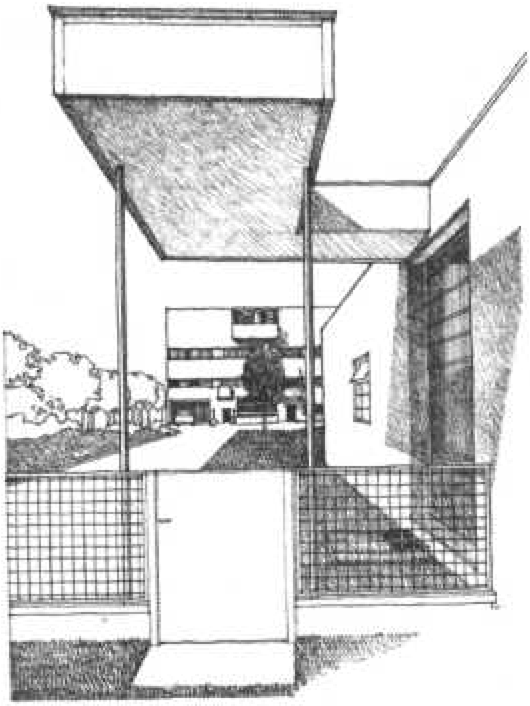


Villa Barbaro, Maser, Italy, 1560–1568, Andrea Palladio
巴拉诺别墅，马塞尔，意大利，1560年—1568年，A. 帕拉蒂奥



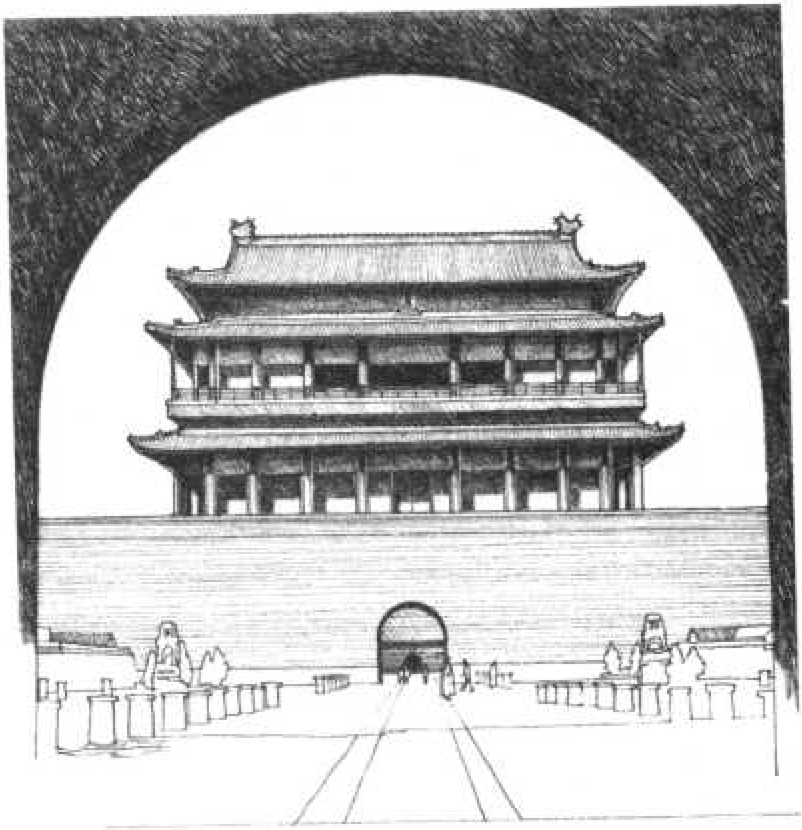
Portals and gateways have traditionally been means of orienting us to the path beyond and welcoming our entry.

从传统意义上讲，入口和门道具有导引我们到达另一侧路径和欢迎人们进入的含义。



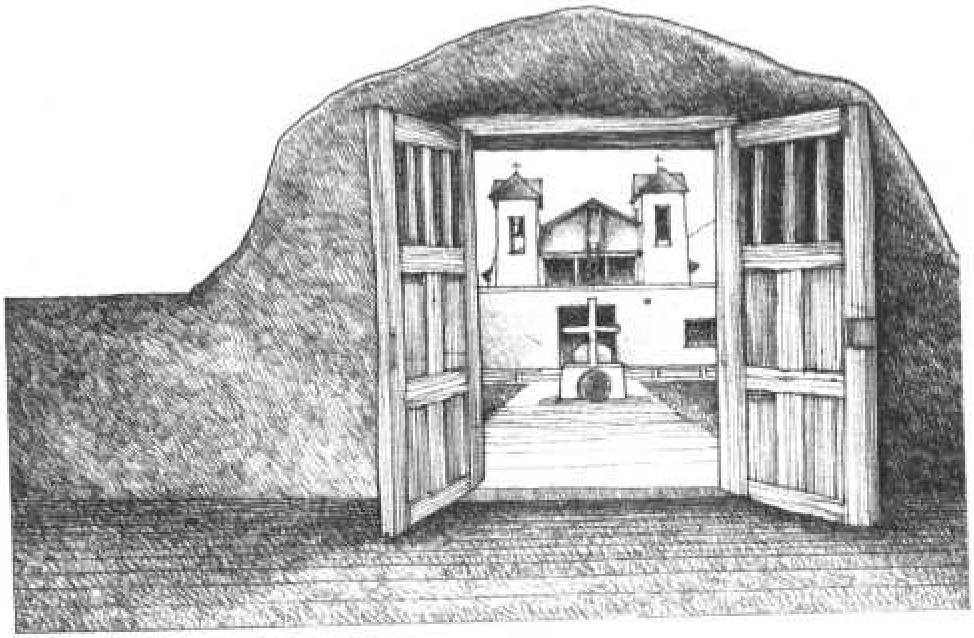
Villa Garches, Vaucresson, France, 1926–1927, Le Corbusier

加歇别墅，沃克里森，法国，1926年—1927年，勒·柯布西埃



Qian Men, Link between the Forbidden City to the north and the Outer City to the south in Peking (Beijing), China, 15th century

前门，北连紫禁城，南接外城，北京，中国，15世纪

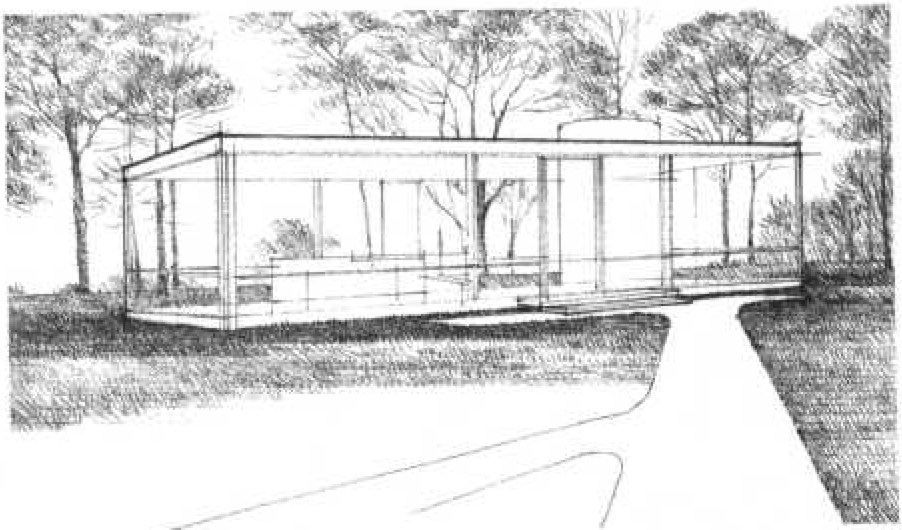


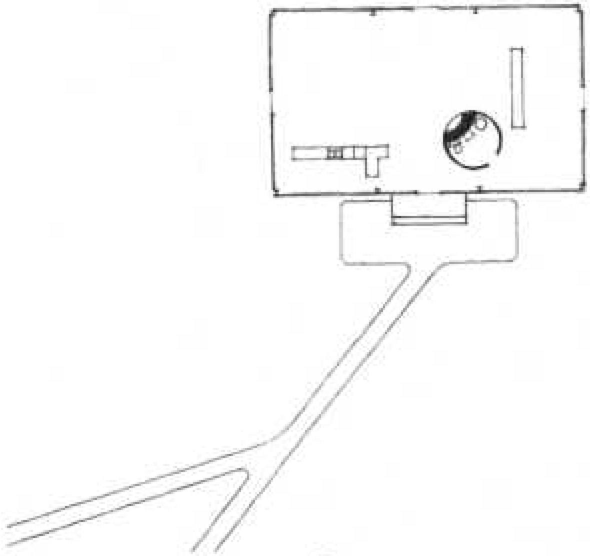
Catholic Church, Taos, New Mexico, 17th century

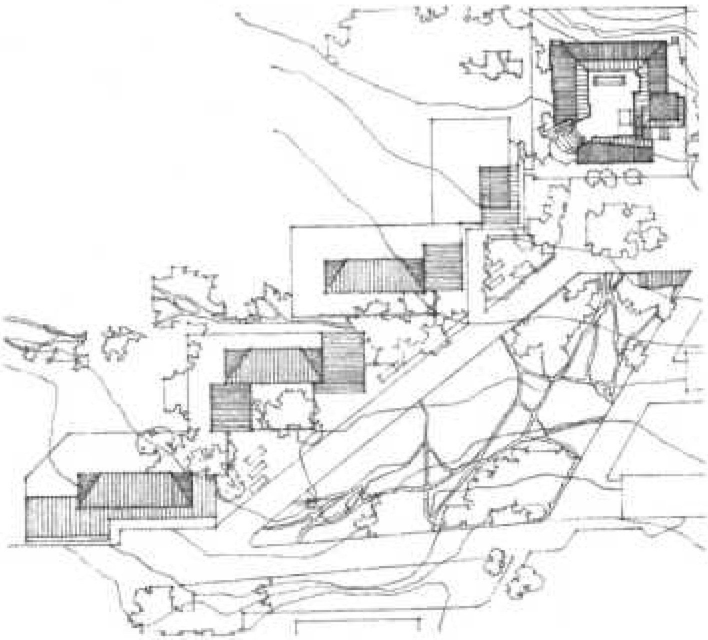
天主教堂，道斯，新墨西哥州，17世纪

Glass House, New Canaan, Connecticut, 1949, Philip Johnson

玻璃住宅，新坎南，康涅狄格州，1949年，P.约翰逊







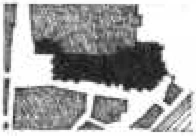
Site Plan, Town Hall at Säynätsalo, Finland, 1950–1952, Alvar Aalto

总平面，赛纳特萨罗市政厅，芬兰，1950年—1952年，A.阿尔托

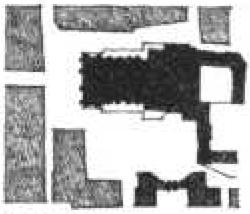


Ramp Into and Through Building, **Carpenter Center for the Visual Arts**, Harvard University, Cambridge, Massachusetts, 1961–1964, Le Corbusier

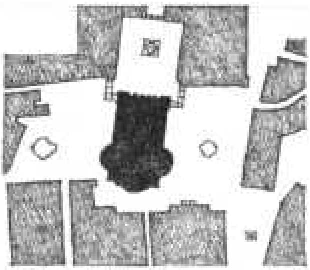
引入并通过建筑物的坡道，卡彭特视觉艺术中心，哈佛大学，剑桥，马萨诸塞州，1961年—1964年，勒·柯布西埃



Verona
维罗那



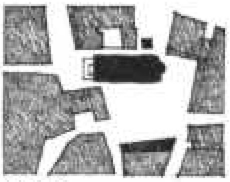
Strasbourg
斯特拉斯堡



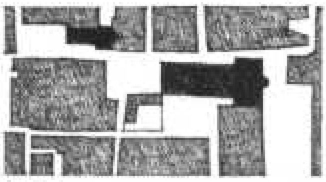
Salzburg
萨尔茨堡

Drawings of church-dominated urban spaces by Camillo Sitte that illustrate the asymmetrical, picturesque approach to the siting of buildings. Only fragments of the churches can be seen from various points in the squares.

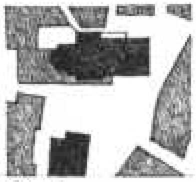
C. 西特绘制的、教堂占主导地位的城市空间，反映了通向建筑物基地的通道是非对称的且风景如画。从广场的各个位置只能看到教堂的局部。



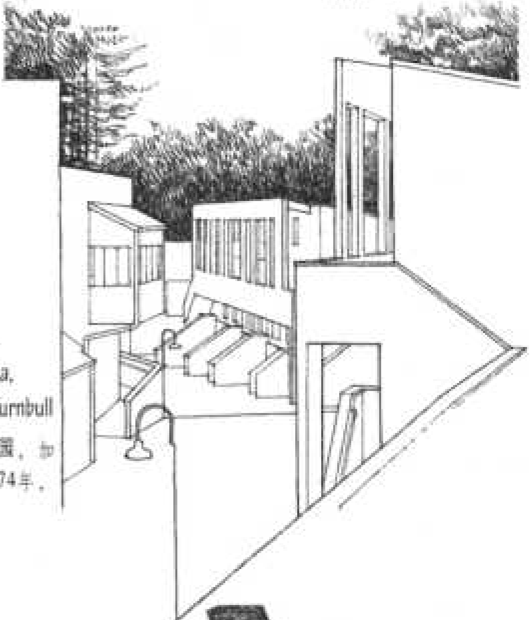
Modena
摩德纳



Lucca
卢卡

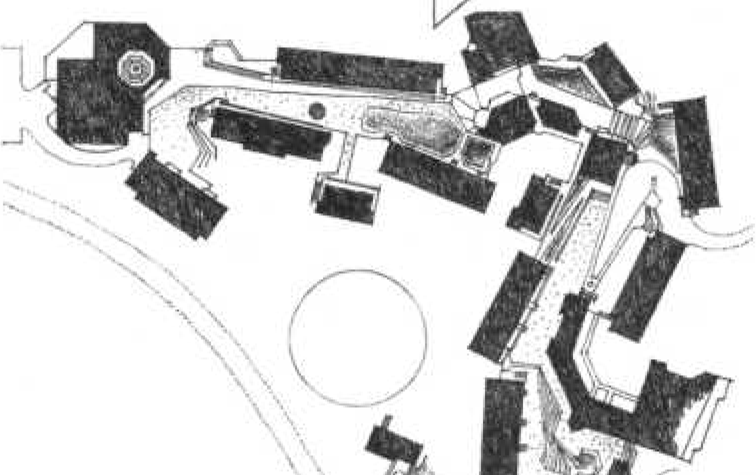


Perugia
佩鲁贾



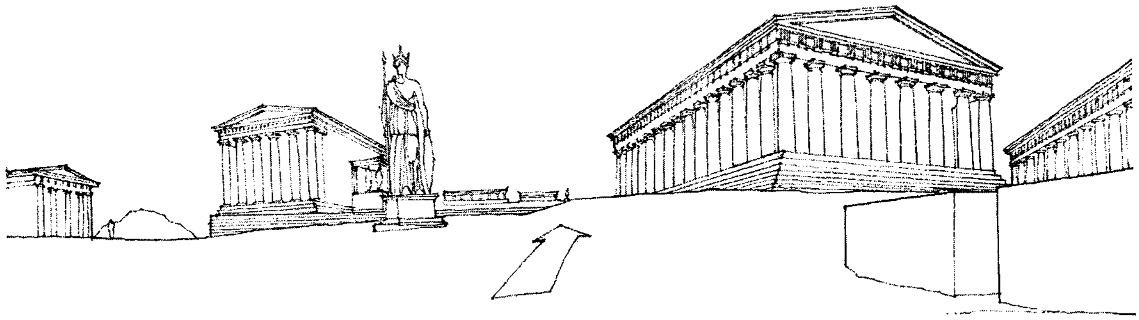
Kresge College, Santa Cruz Campus, University of California, 1972–1974, MLTW/Moore and Turnbull

克雷吉斯学院、圣克鲁兹校园，加利福尼亚大学，1972年—1974年，MLTW/穆尔和特恩布尔

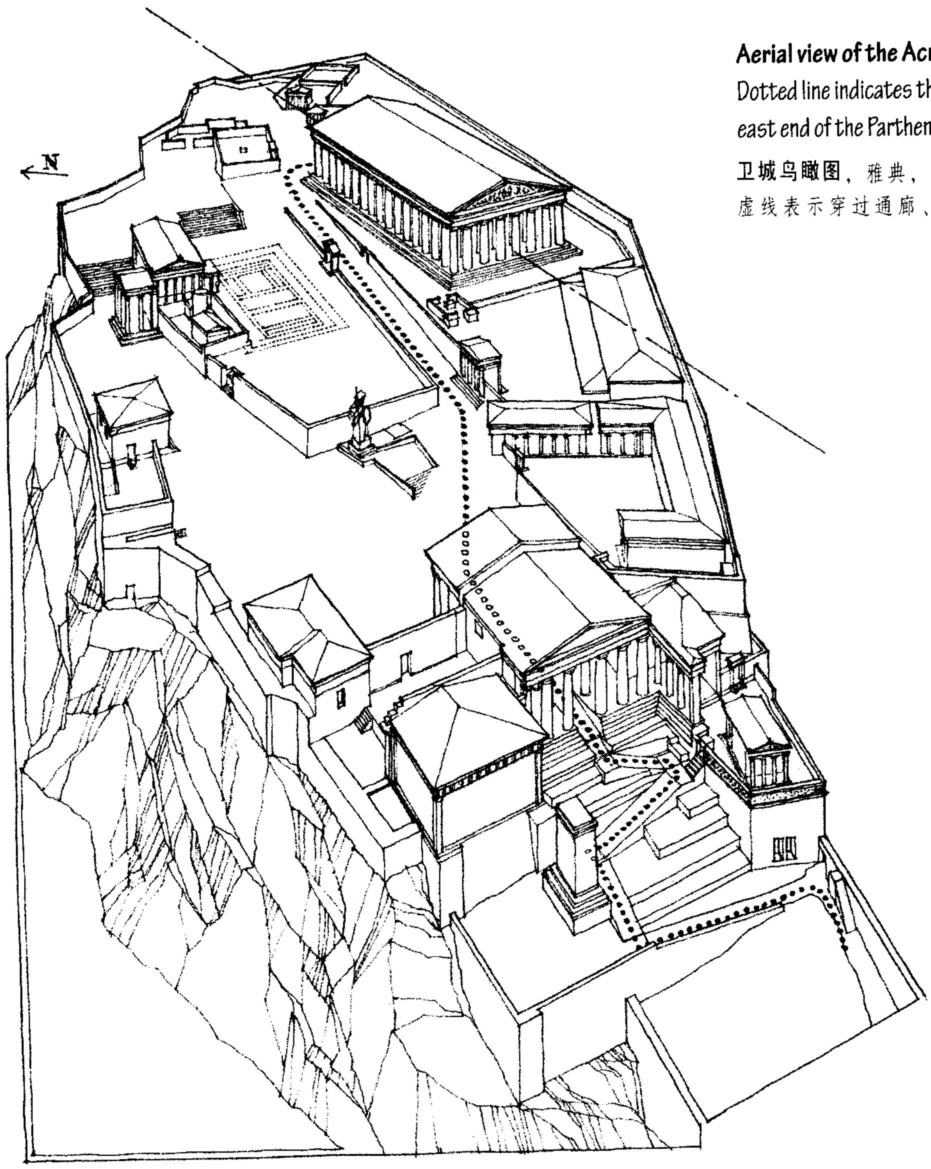




Street in Siena, Italy
西耶那的街道，意大利

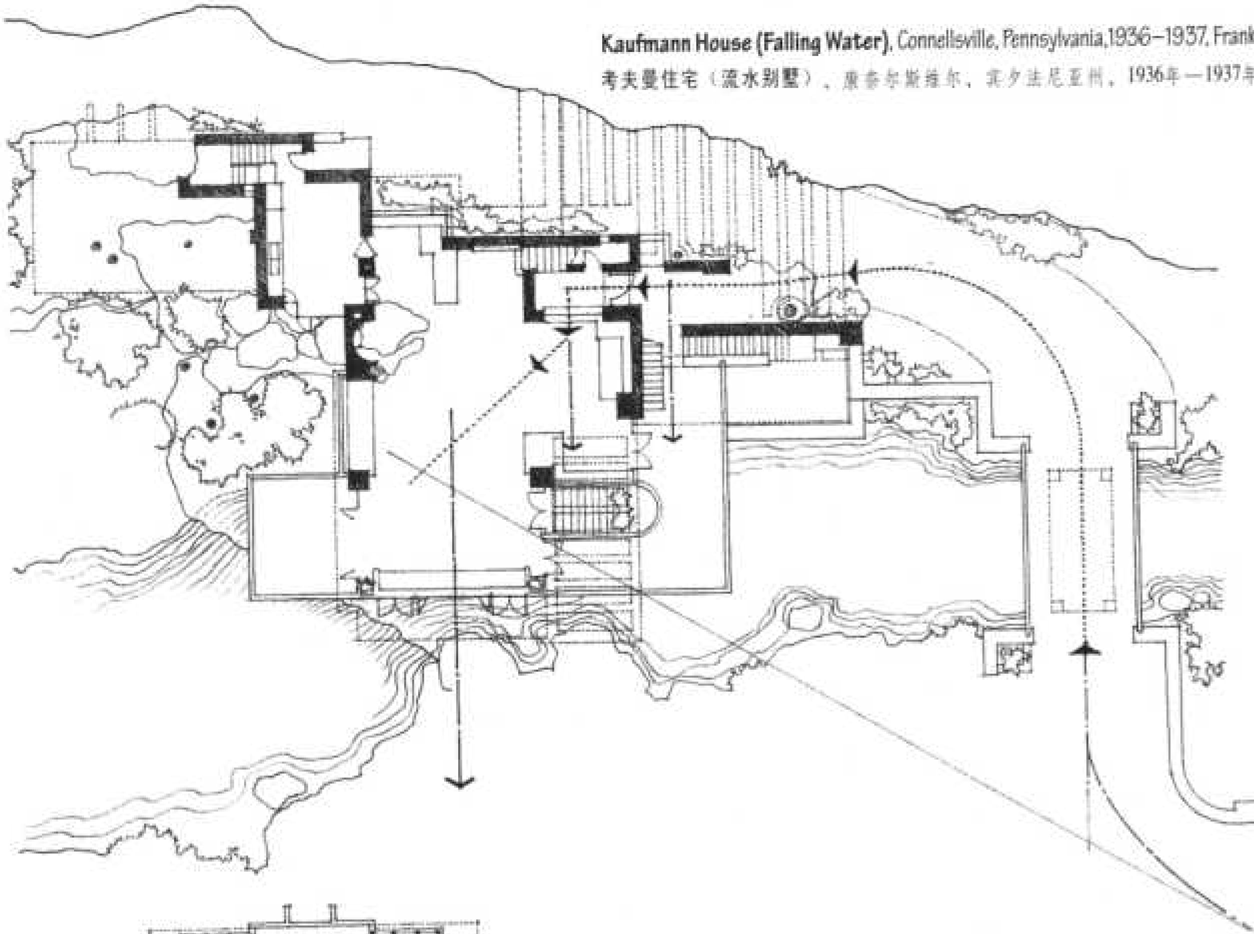


View looking east from the Propylaea
从通廊向东看



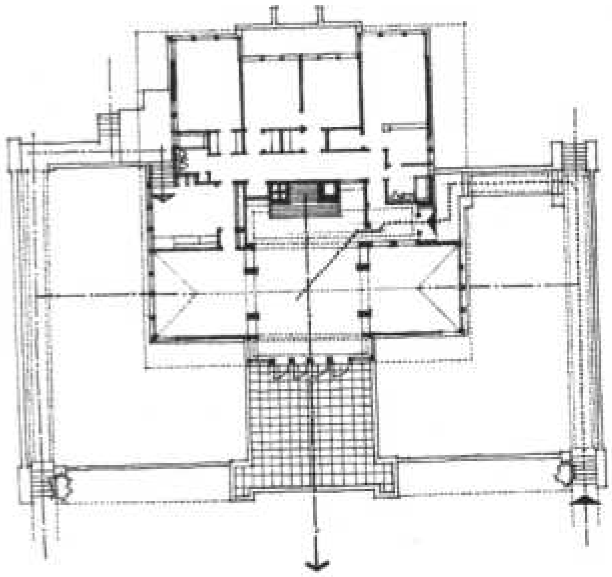
Aerial view of the Acropolis, Athens, Greece.
Dotted line indicates the path through the Propylaea to the east end of the Parthenon.

卫城鸟瞰图，雅典，希腊
虚线表示穿过通廊、到达东端帕提侬神庙的路径。



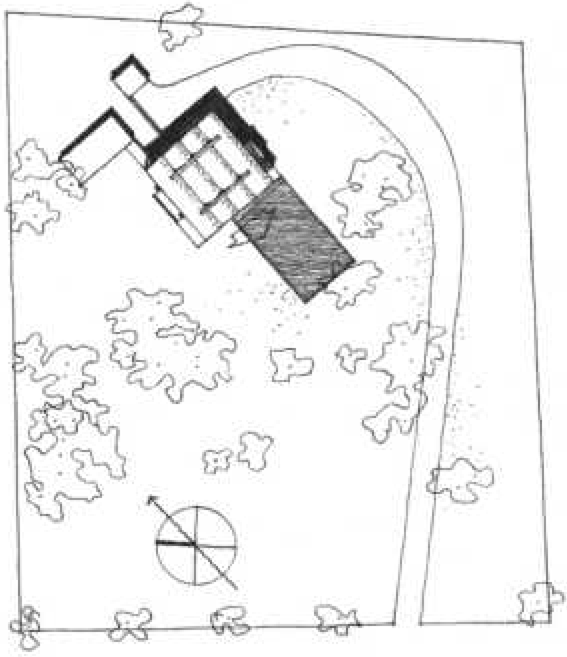
Kaufmann House (Falling Water), Connellsville, Pennsylvania, 1936–1937, Frank Lloyd Wright

考夫曼住宅（流水别墅），康奈尔斯维尔，宾夕法尼亚州，1936年—1937年，F.L.莱特



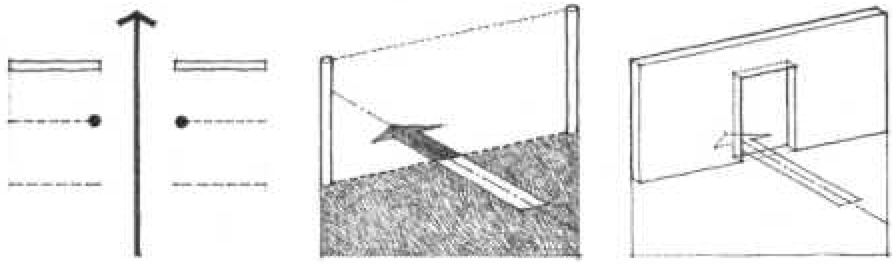
Edwin Cheney House, Oak Park, Illinois, 1904, Frank Lloyd Wright

E.切尼住宅，奥克帕克，伊利诺斯州，1904年，F.L.莱特



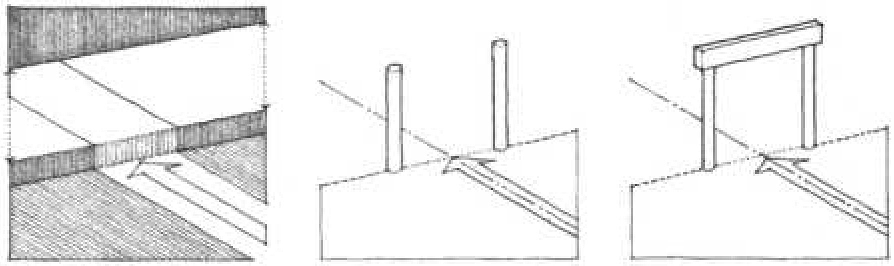
Villa Hutheesing (Project), Ahmedabad, India, 1952, Le Corbusier

哈齐星别墅（方案），艾哈迈达巴德，印度，1952年，勒·柯布西埃



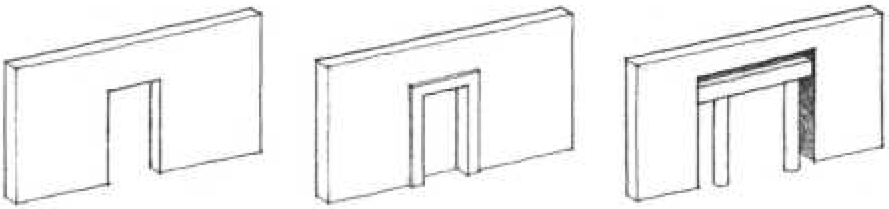
Entering a building, a room within a building, or a defined field of exterior space, involves the act of penetrating a vertical plane that distinguishes one space from another and separates "here" from "there."

进入一栋建筑，建筑物中的一个房间，或者进入外部空间中某一限定的区域，都牵涉到穿越一个垂直面的行动。这个垂直面将空间彼此区分开来，分出"此处"和"彼处"。



The act of entering can be signified in more subtle ways than punching a hole in a wall. It may be a passage through an implied plane established by two pillars or an overhead beam. In situations where greater visual and spatial continuity between two spaces is desired, even a change in level can establish a threshold and mark the passage from one place to another.

可以采用比墙上打洞更巧妙的方式来表明进入这一动作。它可以是一条通道，穿过由两根柱子或者一道顶梁所暗示的面。在某些情况下，特别需要保持两空间之间的视觉与空间连续性。这时，即使是高程的变化也能形成一道门槛，并标识出从一个场所到另一个场所的过渡。



In the normal situation where a wall is used to define and enclose a space or series of spaces, an entrance is accommodated by an opening in the plane of the wall. The form of the opening, however, can range from a simple hole in the wall to an elaborate, articulated gateway.

一般情况下，用墙壁来限定并围合一个空间或多个空间，因此墙面上的开洞便提供了入口。然而，洞口可以采用多种方式，从墙面上的一个简单开洞直至精心设计、连接清晰的门道。

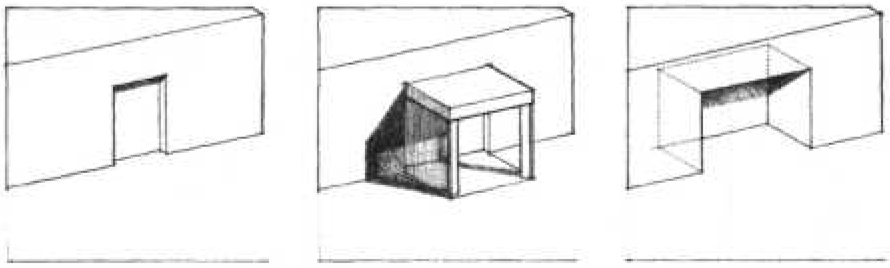


Regardless of the form of the space being entered or the form of its enclosure, the entrance into the space is best signified by establishing a real or implied plane perpendicular to the path of the approach.

无论进入的空间形式如何，或者其围护物的形式如何，进入空间的入口最好的表现方式是设置一道垂直于通道路径的垂直面，此面可以是实际存在的，也可以是暗示的。

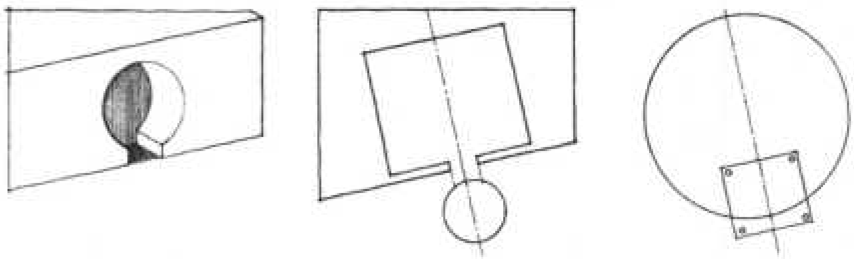
Entrances may be grouped formally into the following categories: flush, projected, and recessed. A flush entrance maintains the continuity of the surface of a wall and can be, if desired, deliberately obscured. A projected entrance forms a transitional space, announces its function to the approach, and provides overhead shelter. A recessed entrance also provides shelter and receives a portion of exterior space into the realm of the building.

入口可以从形式上分组，归为以下几类：平式、凸式和凹式。平式入口保持着墙面的连续性，如果需要还可以将入口特意设计得不那么显眼。凸式入口形成一个过渡空间，表明其功能有别于通道，同时提供了头顶上的遮挡。凹式入口同样提供了遮挡，并将一部分室外空间引入建筑领域。



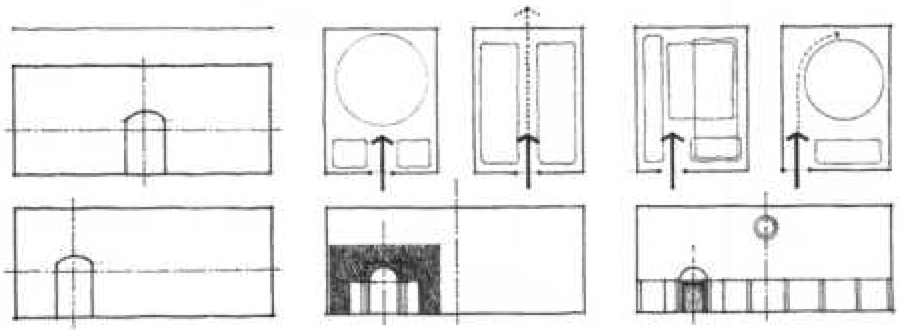
In each of the above categories, the form of the entrance can be similar to, and serve as a preview of, the form of the space being entered. Or it can contrast with the form of the space to reinforce its boundaries and emphasize its character as a place.

在以上各种方式中，入口的形式可以与已经进入的空间形式相似，起着序幕的作用。或者，入口形式可以与空间形式形成对比，以加强入口的边界并强调其作为一个场所的特征。



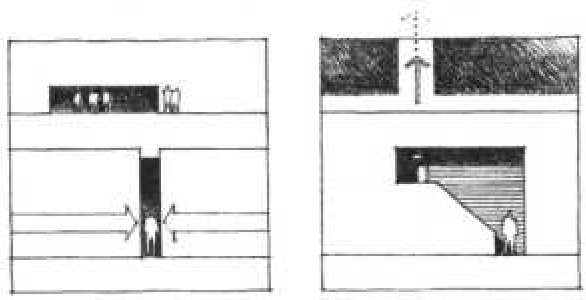
In terms of location, an entrance can be centered within the frontal plane of a building or be placed off-center to create a condition of local symmetry about its opening. The location of an entrance relative to the form of the space being entered will determine the configuration of the path and the pattern of the activities within the space.

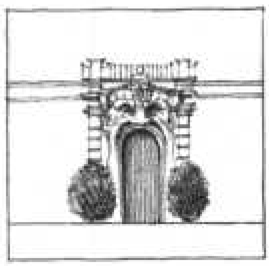
至于位置，入口可以居于建筑物立面的正中，也可以偏离中心而以入口为轴建立自己的对称关系。入口的位置与所进入的空间形式之间的关系将决定路径的形状以及空间中的行为模式。



The notion of an entrance can be visually reinforced by:
- making the opening lower, wider, or narrower than anticipated
- making the entrance deep or circuitous
- articulating the opening with ornamentation or decorative embellishment

通过下列手法，可以从视觉上加强入口的意义：
- 使之出乎意料的低矮、宽阔或狭窄
- 使入口深陷或迂回
- 用图案或装饰来清晰地表达洞口

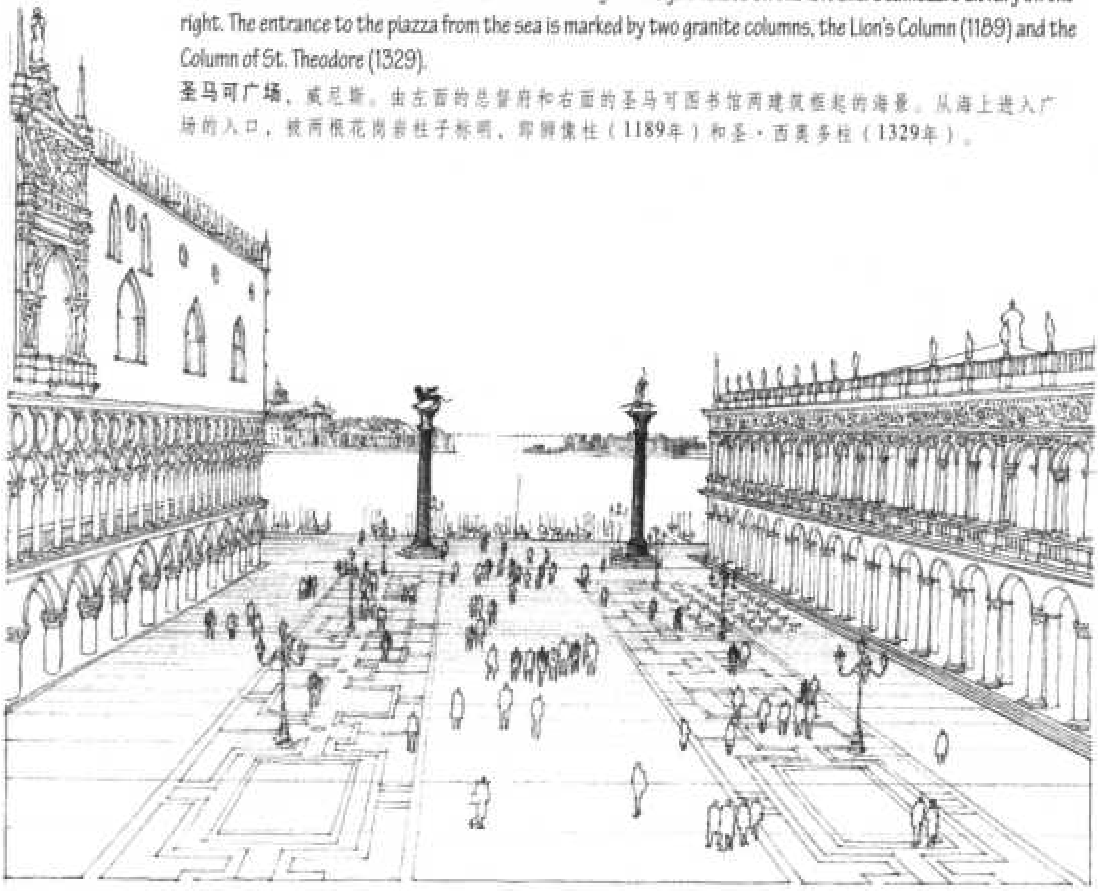


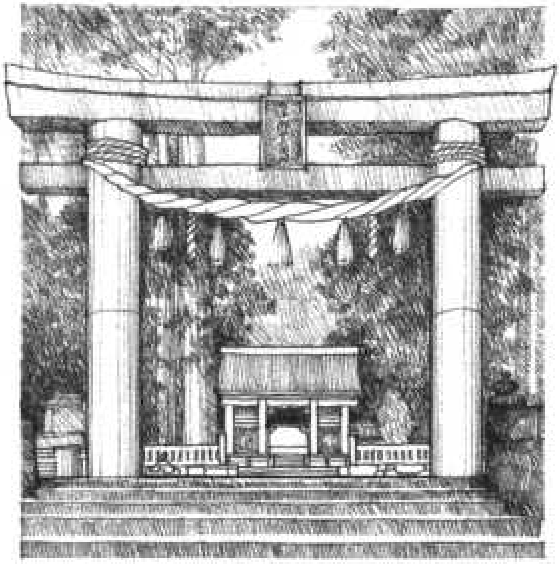


Palazzo Zuccari, Rome, c. 1592, Federico Zuccari
祖卡里宫，罗马，1592年，F. 祖卡里

Piazza San Marco, Venice. View of the sea framed by the Doge's Palace on the left and Scamozzi's Library on the right. The entrance to the piazza from the sea is marked by two granite columns, the Lion's Column (1189) and the Column of St. Theodore (1329).

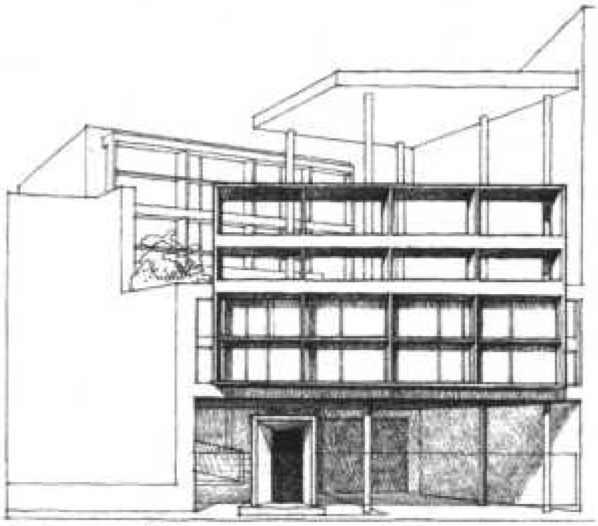
圣马可广场，威尼斯。由左面的总督府和右面的圣马可图书馆两建筑框起的海景。从海上进入广场的入口，被两根花岗岩柱子标明，即狮像柱（1189年）和圣·西奥多柱（1329年）。





O-torii, first gate to the Toshogu Shrine, Nikko, Tochigi Prefecture, Japan, 1636

牌坊，通向东照宫神社的第一道门，日光，栃木县，日本，1636年

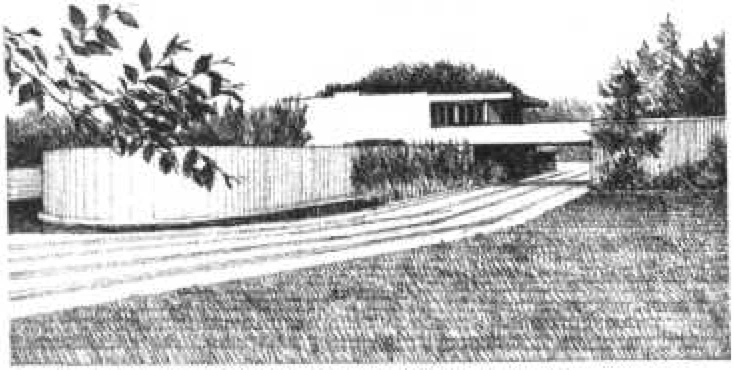


Dr. Currutchet's House, La Plata, Argentina, 1949, Le Corbusier

A portal marks the entrance for pedestrians within a larger opening that includes space for a carport.

克拉切特医生住宅，拉普拉塔，阿根廷，1949年，勒·柯布西埃

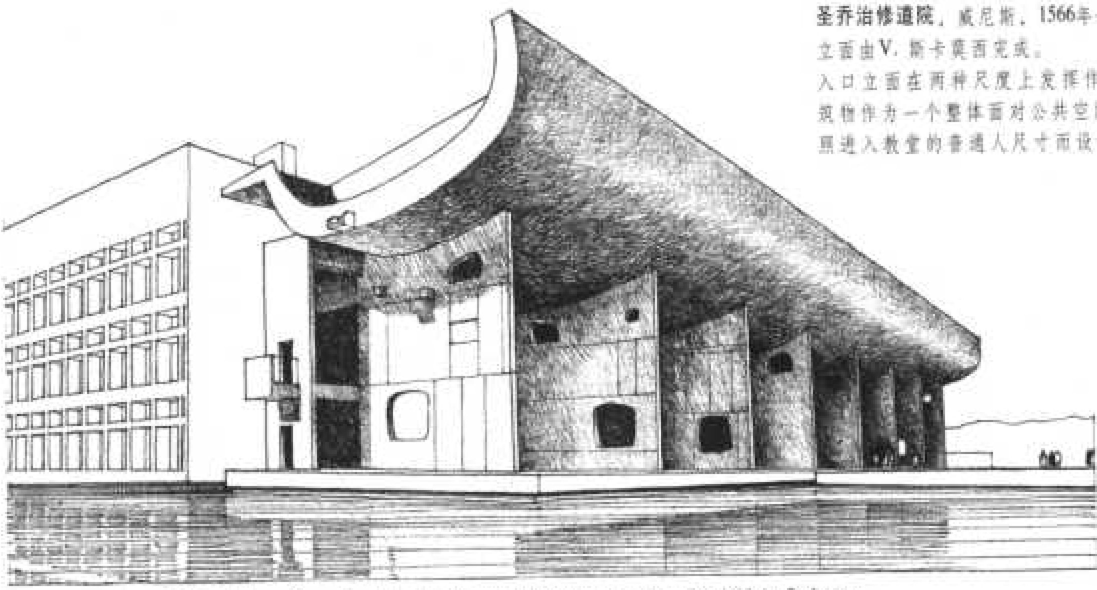
一个大型洞口内的柱廊标明了为行人而设的入口，洞口中还包含着一个开敞式停车位的空间。



Von Sternberg House, Los Angeles, California, 1936, Richard Neutra
A curving drive leads to an entranceway for automobiles while the front door to the interior of this residence is in an entry court beyond.
冯·斯顿伯格住宅，洛杉矶，加利福尼亚州，1936年，R.纽特拉
一条弯曲的行车道通向进汽车的大门，而进入这所住宅内部的前门则在这道大门后面的入口庭院里。



S. Giorgio Maggiore, Venice, 1566–1610, Andrea Palladio.
Facade completed by Vicenzo Scamozzi.
The entrance facade operates at two scales: that of the building as a whole facing a public space and another at the size of a person entering the church.
圣乔治修道院，威尼斯，1566年—1610年，A.帕拉蒂奥
立面由V.斯卡莫齐完成。
入口立面在两种尺度上发挥作用：一种尺度是将建筑物作为一个整体面对公共空间；另外一种尺度是按照进入教堂的普通人尺寸而设定的。

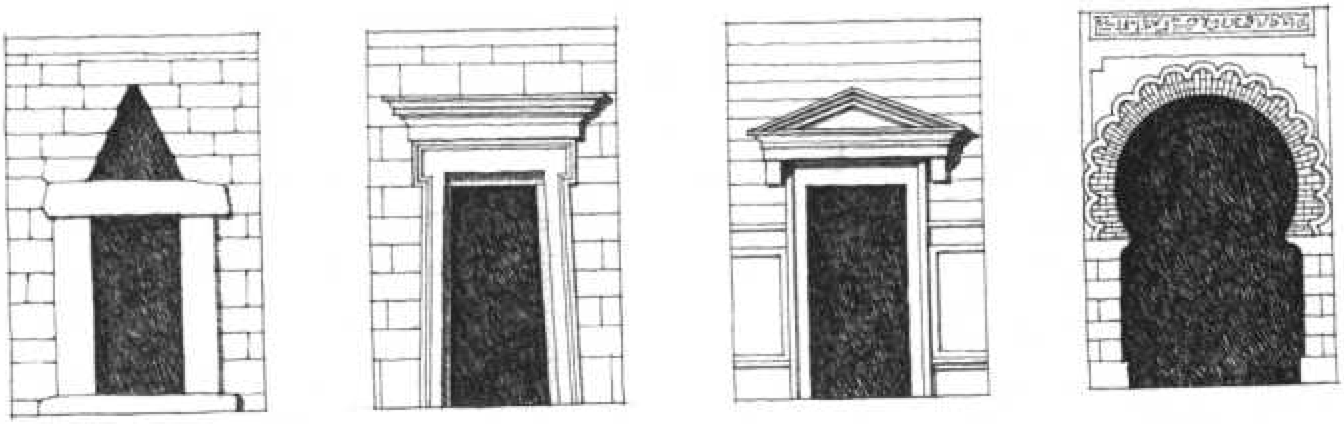


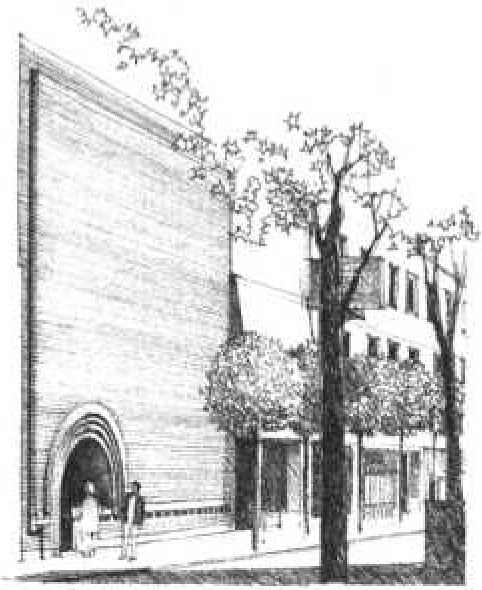
Legislative Assembly Building, Chandigarh, Capitol Complex of Punjab, India, 1956–1959, Le Corbusier.
The entrance colonnade is scaled to the public nature of the building.
议会大厦，昌迪加尔，旁遮普的议会综合体，印度，1956年—1959年，勒·柯布西埃
入口柱廊的尺度符合建筑物的公共性。



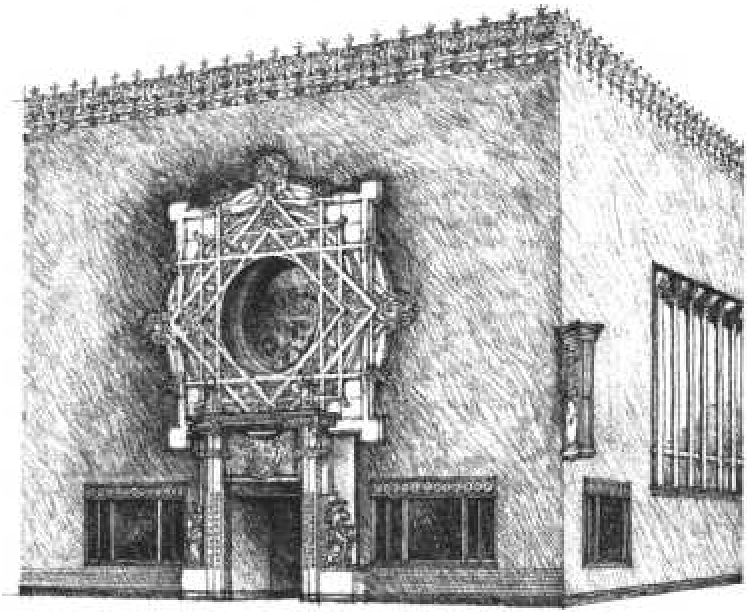
Katsura Palace, Kyoto, Japan, 17th century.
While the fence separates, the gateway and the stepping stones provide continuity between the Imperial Carriage Stop and the Gepparo (Moon-Wave Pavilion) beyond.

桂离宫，京都，日本，17世纪
尽管围墙将皇家驿站与墙外的月波亭分开，但是门道和踏脚石却将二者联系起来。



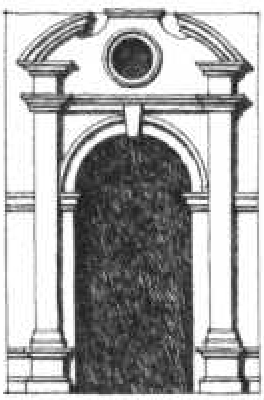


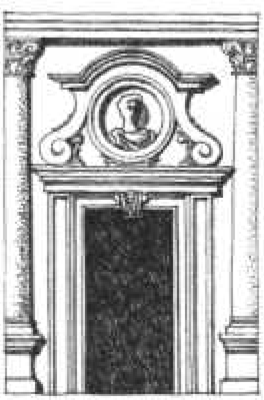
Morris Gift Shop, San Francisco, California, 1948–1949, Frank Lloyd Wright
莫里斯礼品商店，旧金山，加利福尼亚州，1948年—1949年，F. L. 莱特

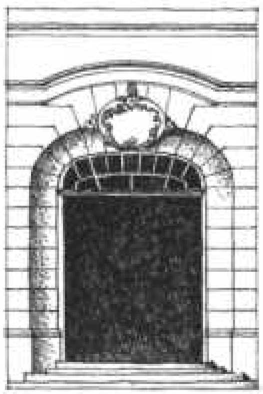


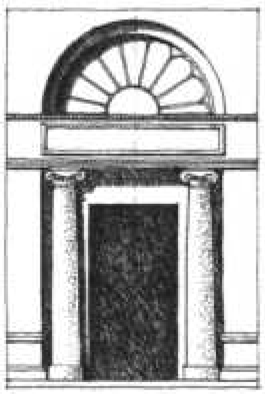
Merchants' National Bank, Grinnell, Iowa, 1914, Louis Sullivan
国家商贸银行，格林涅尔，衣阿华州，1914年，L. 萨利文

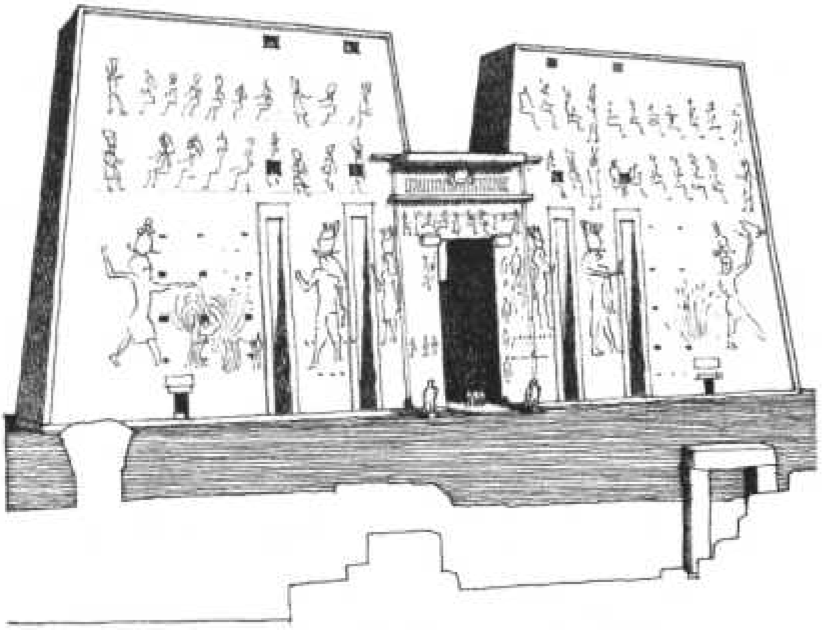
Elaborated openings within vertical planes mark the entrances to these two buildings.
垂直面上精心设计的洞口标明了通向这两座建筑的入口。





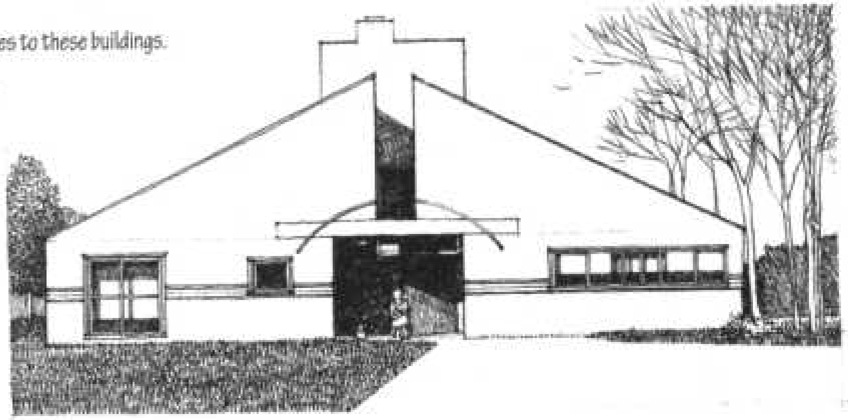




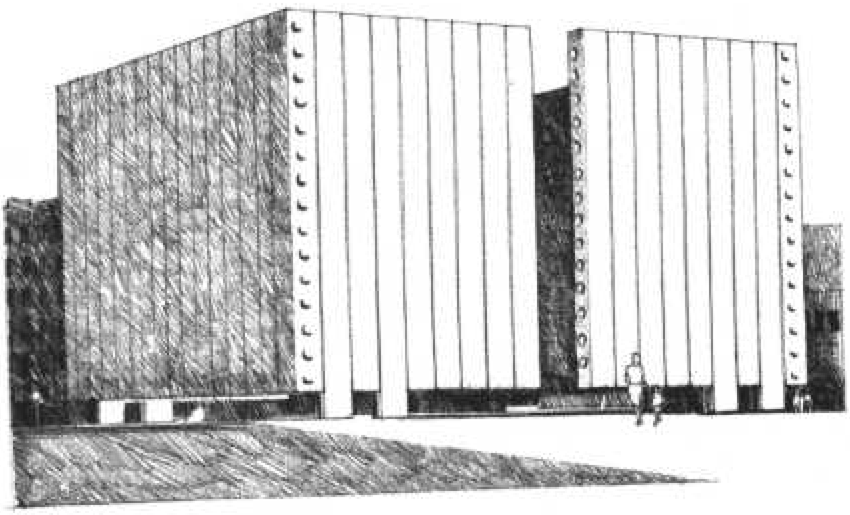


Entrance Pylons, Temple of Horus at Edfu, 237 B.C.–57 B.C.
塔门入口，埃德福的太阳神庙，公元前237年—公元前57年

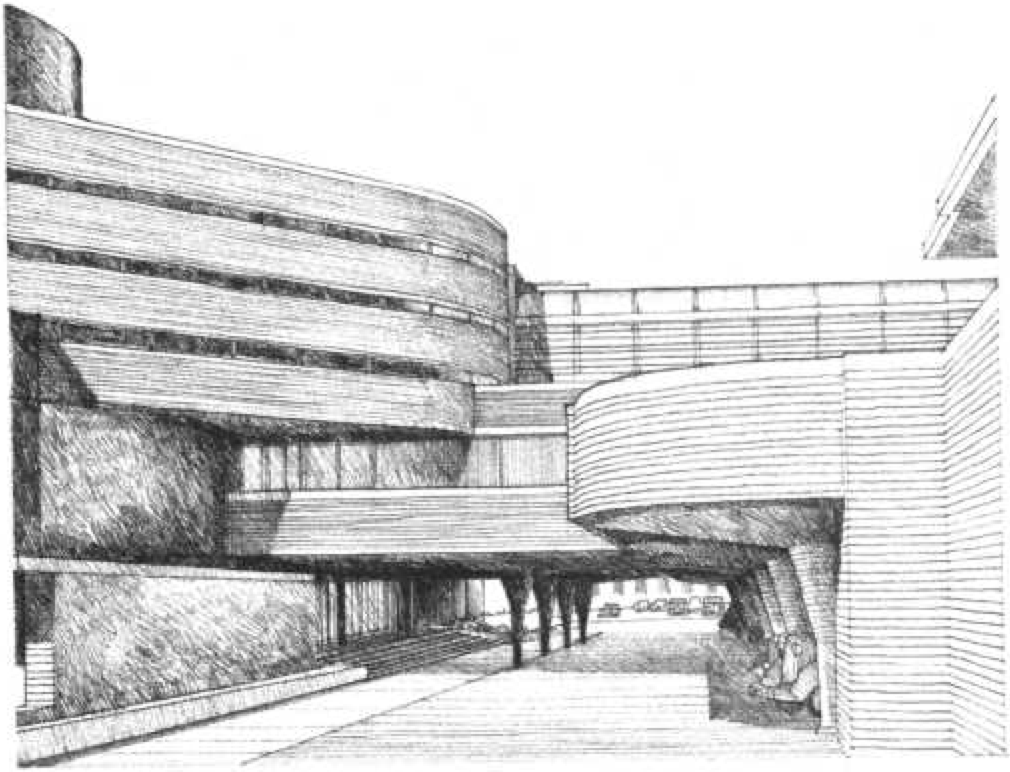
A vertical break or separation in the facade defines the entrances to these buildings.
立面上的竖向裂缝或缺口限定了通向这些建筑的入口。



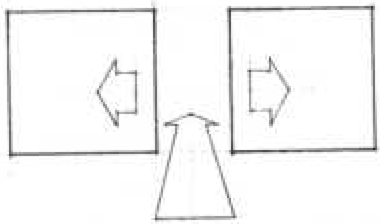
House for Mrs. Robert Venturi, Chestnut Hill, Pennsylvania, 1962–1964, Venturi and Short
R. 文丘里夫人住宅，栗山，宾夕法尼亚州，1962年—1964年，文丘里和肖特



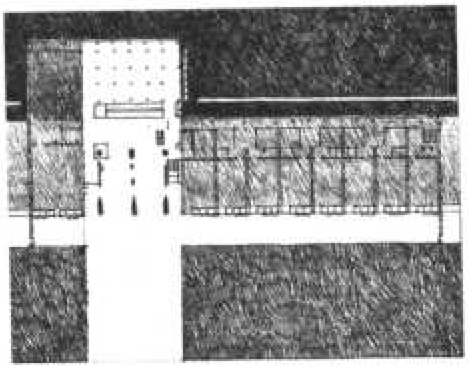
John F. Kennedy Memorial, Dallas, Texas, 1970, Philip Johnson
J. F. 肯尼迪纪念馆，达拉斯，得克萨斯州，1970年，P. 约翰逊



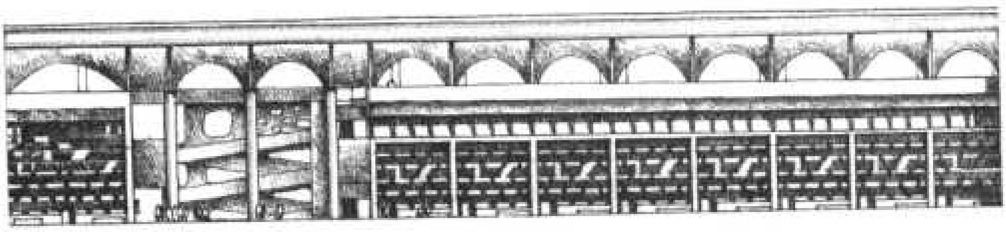
Entrance to the Administration Building, Johnson Wax Co., Racine, Wisconsin, 1936–1939, Frank Lloyd Wright
通向办公楼的入口，约翰逊制蜡公司，拉辛，威斯康星州，1936年—1939年，F.L.莱特



The High Court, Chandigarh, *Capitol Complex of Punjab, India, 1956, Le Corbusier*
高等法院，昌迪加尔，旁遮普的议会综合体，印度，1956年，勒·柯布西埃



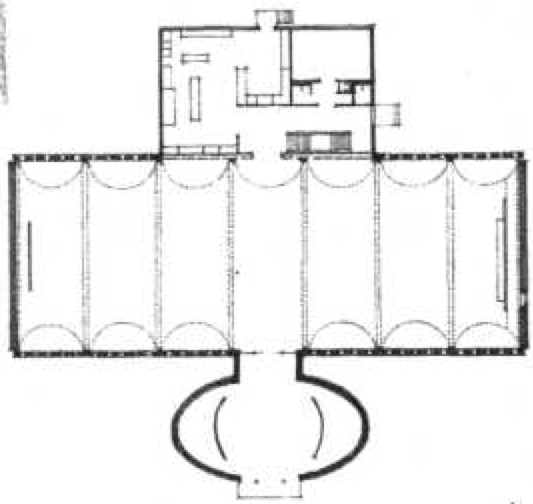
Plan Diagram
平面图示



North Elevation
北立面



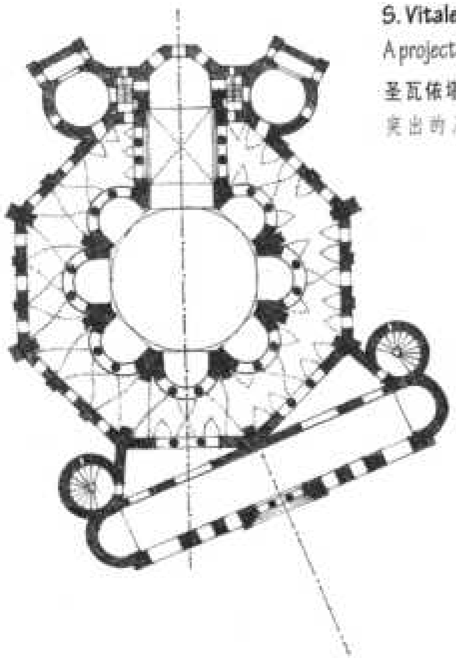
The Pantheon, *Rome, A.D. 120–124.*
Entrance portico reconstructed from an earlier temple of 25 B.C.
万神庙，罗马，120年—124年
入口门廊是以一座公元前25年建造的早期神庙为基础重建的。



Kneses Tifereth Israel Synagogue,
Portchester, New York, 1954, Philip Johnson
克尼西斯·蒂弗列犹太教堂，
波彻斯特，纽约州，1954年，P.约翰逊



Pazzi Chapel, *added to the Cloister of Santa Croce, Florence, Italy, 1429–1446, Filippo Brunelleschi*
巴吉小教堂，圣卡罗斯修道院扩建部分，佛罗伦萨，意大利，1429年—1446年，F.伯鲁涅勒斯奇

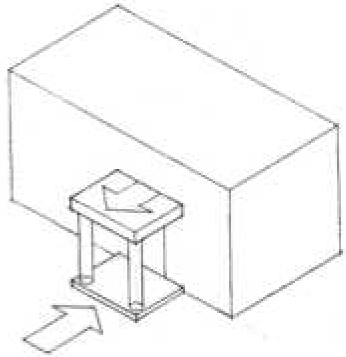


S. Vitale, Ravenna, Italy, A.D. 526–546

A projected entry space can reorient the principle axis of a building organization to that of the exterior space it fronts.

圣瓦依塔尔，拉文纳，意大利，526年—546年

突出的入口空间可以使建筑组合的主要轴线与建筑物所面对的外部空间相适应。



Porches, porticos, and marquees project from the main mass of a building to provide shelter, welcome, and announce the point of entry.

门廊、柱廊以及门罩等突出于建筑物主体的东西可以提供遮挡、表示欢迎，同时也显示出入口位置。

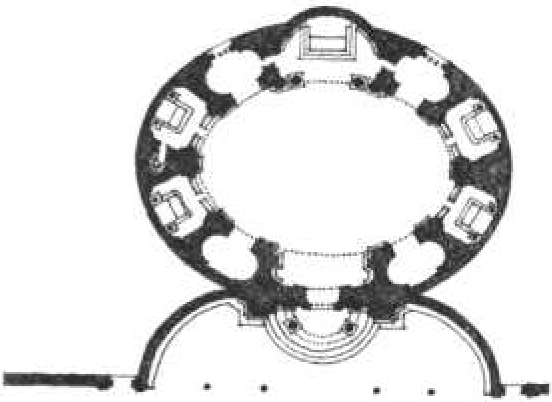




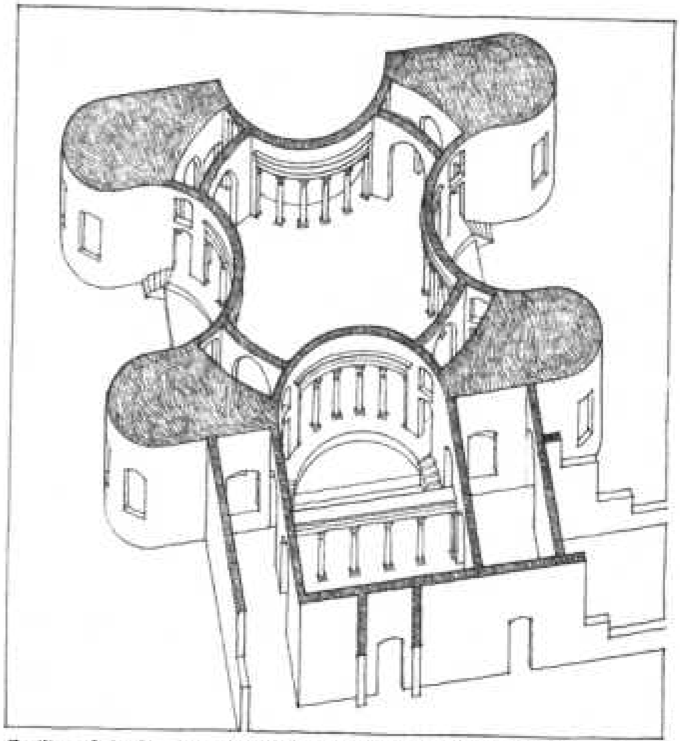
The Oriental Theater, Milwaukee, Wisconsin, 1927, Dick and Bauer

东方剧院，密尔沃基，威斯康星州，1927年，狄克及鲍尔

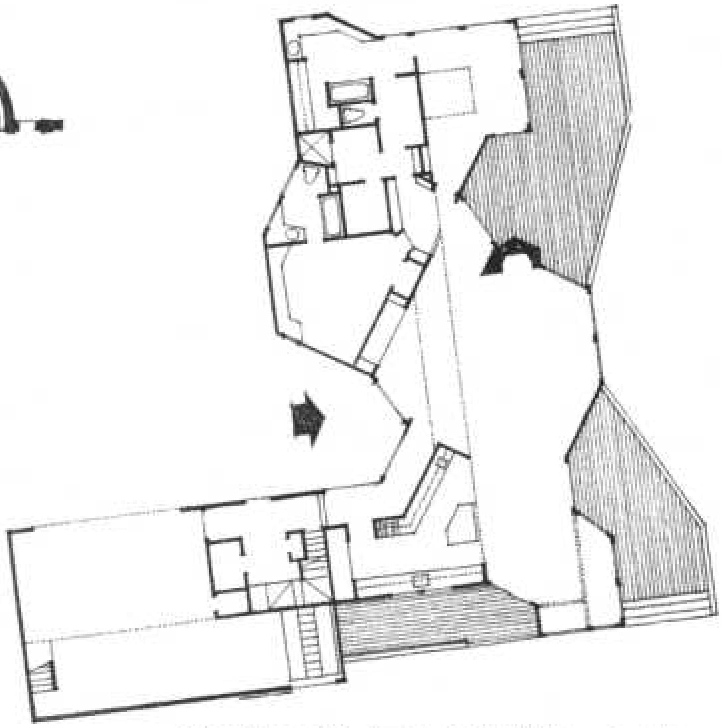




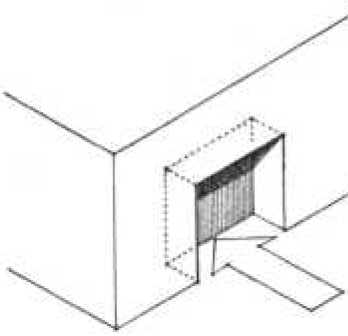
S. **Andrea del Quirinale**, *Rome, 1670, Giovanni Bernini*
奎利纳尔的圣安德里亚，罗马，1670年，G.伯尼尼



Pavilion of the Academia, Hadrian's Villa, Tivoli, Italy, A.D. 118–125
(*after a drawing by Heine Kahler*)
学术园，哈德良别墅，提沃利，意大利，118年—125年
（模仿海恩·凯勒的绘图）



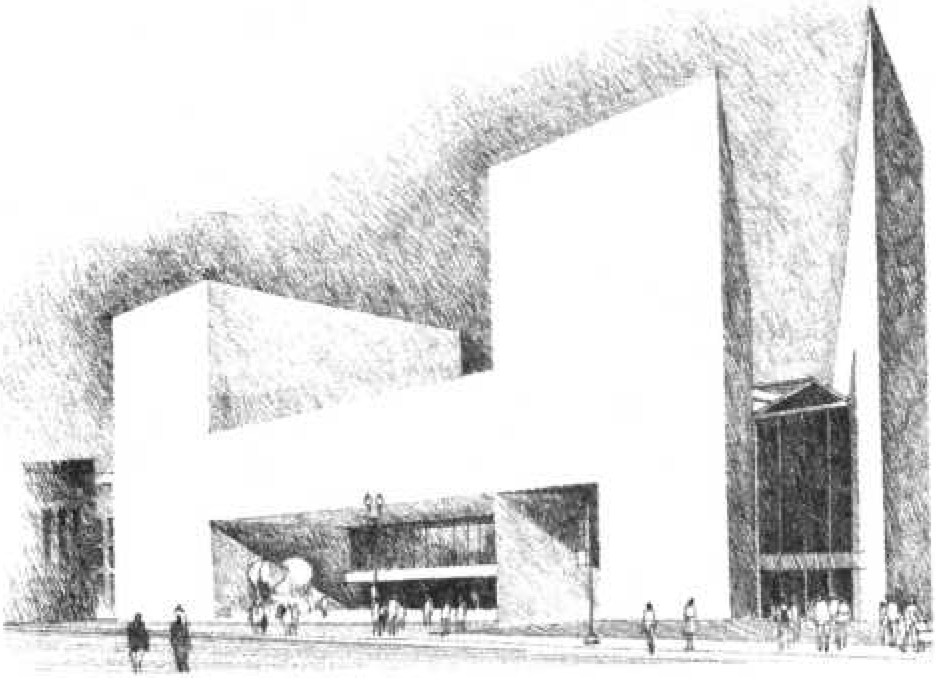
Gagarin House, *Peru, Vermont, 1968, MLTW/Moore-Turnbull*
格加林住宅，佩鲁，佛蒙特州，1968年，MLTW/穆尔和特恩布尔



Examples of spaces recessed to receive those entering a building.
空间凹进的实例，目的是接纳进入建筑物的人们。



S. Andrea, Mantua, Italy, 1472–1494, Leon Battista Alberti
圣安德里亚，曼图亚，意大利，1472年—1494年，L. B. 阿尔伯蒂



East Building, National Gallery of Art, Washington, D.C., 1978, I.M. Pei and Partners
东馆，国家美术馆，华盛顿特区，1978年，贝聿铭及合作者

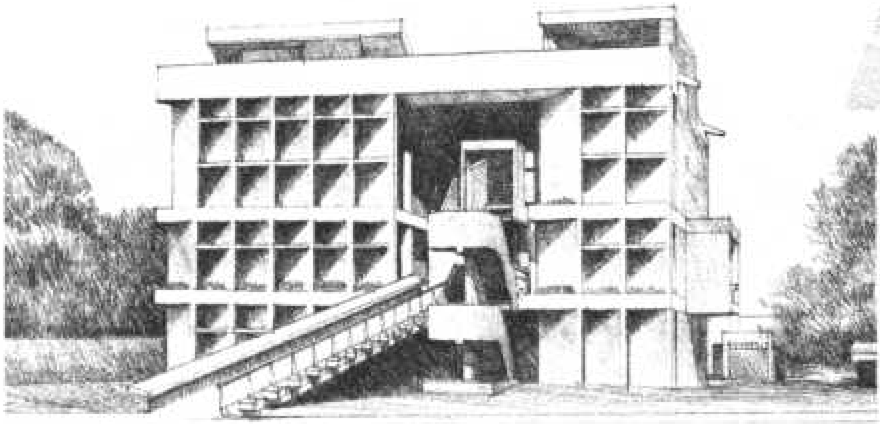
Steps and ramps introduce a vertical dimension and add a temporal quality to the act of entering a building.

台阶与坡道引入了垂直量度，给进入建筑的动作增加了时间性。



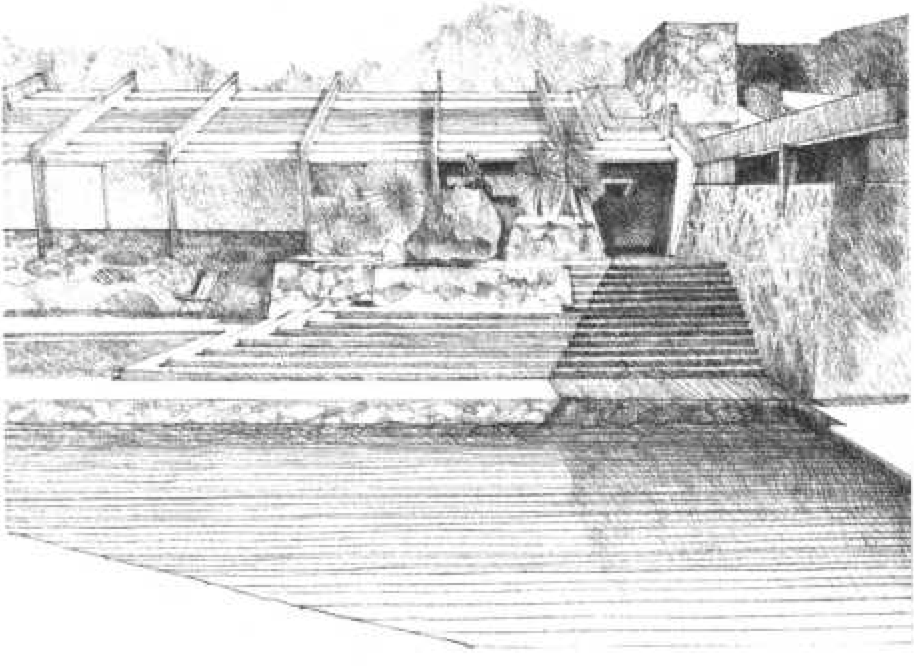
Rowhouses in Galena, Illinois

联排住宅，加利纳，伊利诺斯州



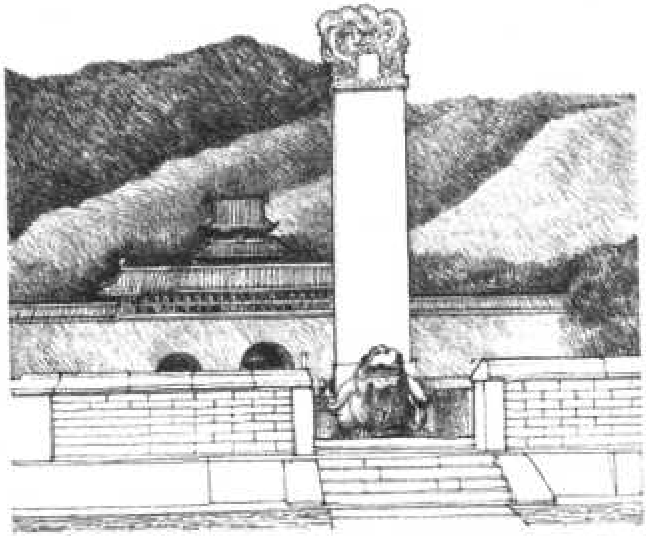
Millowners Association Building, Ahmedabad, India, 1954, Le Corbusier

纺织实业家协会大厦，艾哈迈达巴德，印度，1954年，勒·柯布西埃



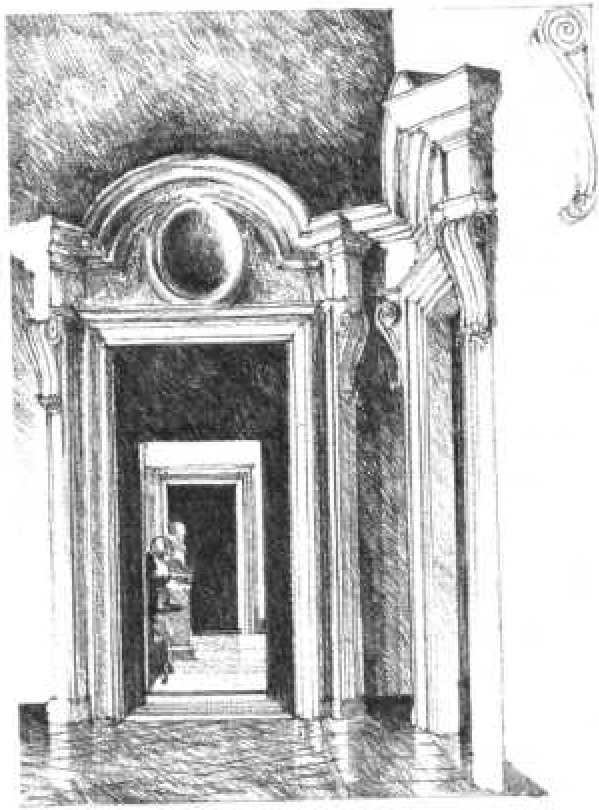
Taliesin West, near Phoenix, Arizona, 1938, Frank Lloyd Wright

西塔里埃森，凤凰城附近，亚利桑那州，1938年，F.L.莱特



A Stele and Tortoise Guarding the **Tomb of Emperor Wan Li** (1573-1620), northwest of Peking (Beijing), China

石碑与乌龟守护着**万历皇帝**（1573年—1620年）的**陵墓**，北京西北，中国



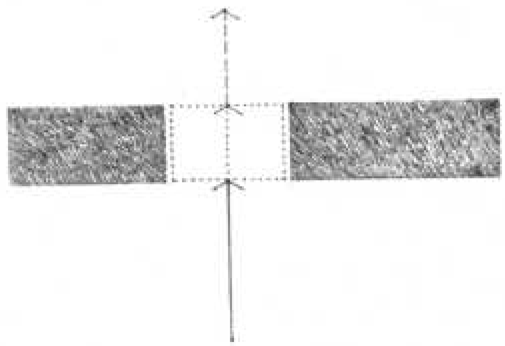
Interior Doorway by Francesco Borromini

室内门道，F. 博洛米尼

Entrances that pierce thick walls create transitional spaces through which one passes in moving from one place to another.

穿越厚墙的入口会产生过渡空间，当人们从一个场所向另一个场所行进的时候就会经过这样的过渡空间。



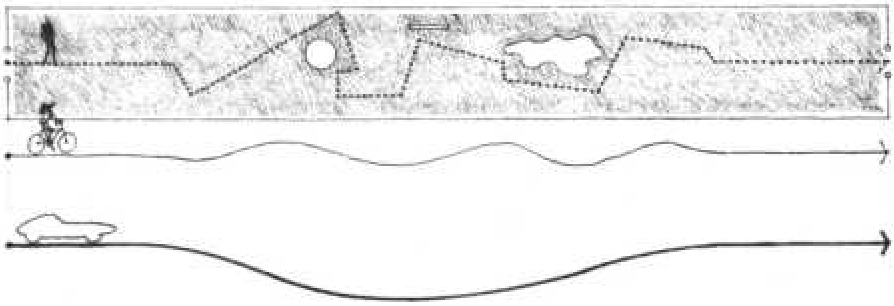


Santa Barbara Courthouse, California, 1929, William Mooser.

The main entrance frames a view to the garden and hills beyond.

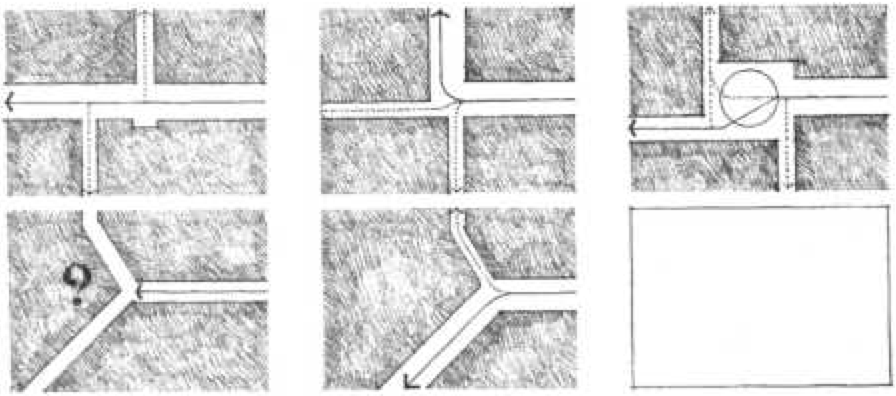
圣塔芭芭拉法院，加利福尼亚州，1929年，W. 穆瑟

主入口框出一幅花园与山构成的远景。



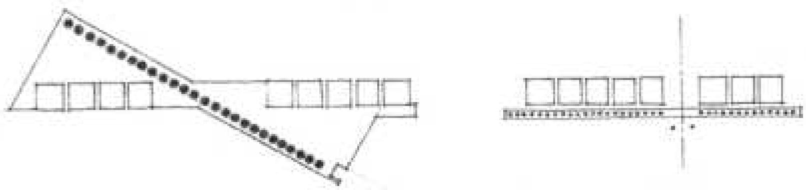
All paths of movement, whether of people, cars, goods, or services, are linear in nature. And all paths have a starting point, from which we are taken through a sequence of spaces to our destination. The contour of a path depends on our mode of transportation. While we as pedestrians can turn, pause, stop, and rest at will, a bicycle has less freedom, and a car even less, in changing its pace and direction abruptly. Interestingly though, while a wheeled vehicle may require a path with smooth contours that reflect its turning radius, the width of the path can be tailored tightly to its dimensions. Pedestrians, on the other hand, although able to tolerate abrupt changes in direction, require a greater volume of space than their bodily dimensions and greater freedom of choice along a path.

所有的运动轨迹，无论是人的、车的、货物的或者用于服务的轨迹，本身都是线状的。所有的路径都有一个起点，从这点开始，我们穿过空间序列到达自己的目的地。路径的形状取决于我们移动的方式。作为行人，我们可以随意地转弯、停留、止步或者休息，而自行车就不能那么自由迅速地改变方向和速度，汽车就更是如此。然而有趣的是，尽管带轮子的车辆可能需要能满足其转弯半径的曲面平滑的路径，但路径的宽度却可以刚好适合车辆的尺寸。相反，尽管行人能够忍受突然的方向改变，却需要比人体尺度大得多的空间体积，而且沿着某一路径，还需要更大的选择自由。



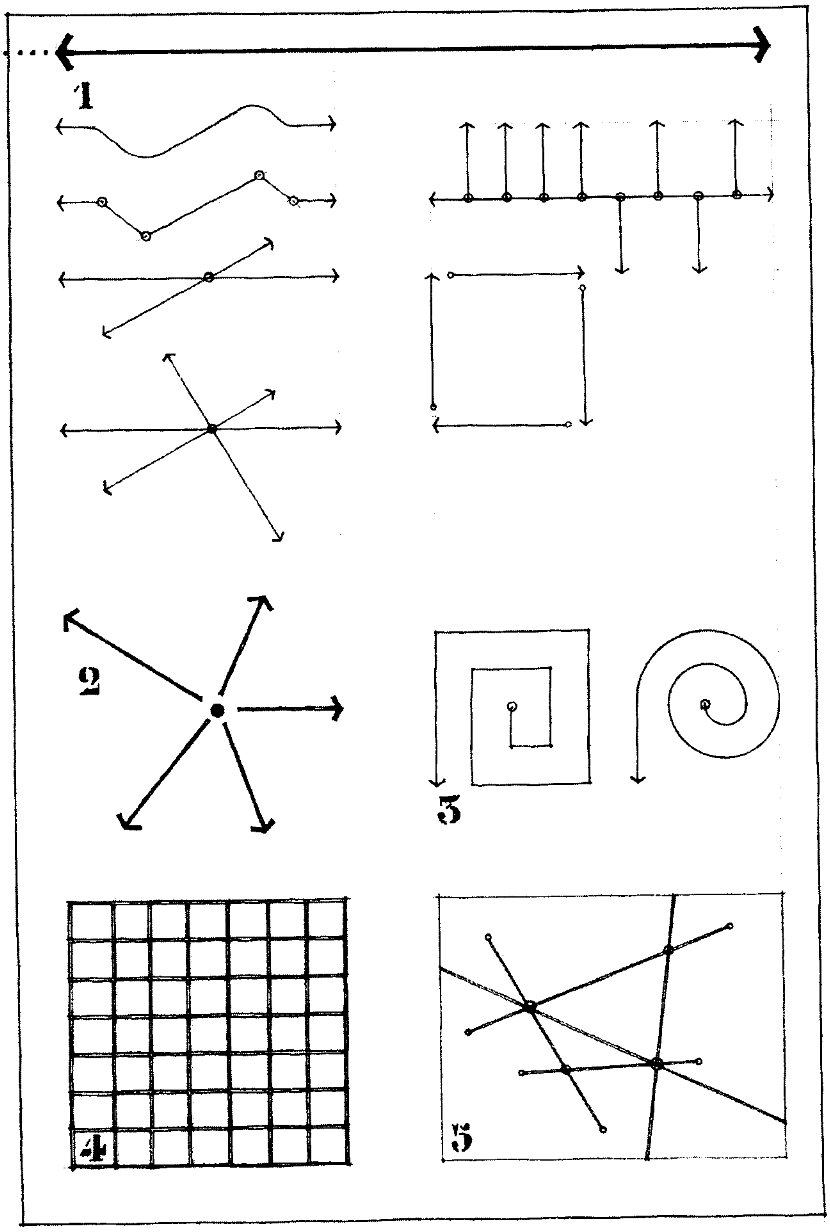
The intersection or crossing of paths is always a point of decision-making for the person approaching it. The continuity and scale of each path at an intersection can help us distinguish between major routes leading to major spaces and secondary paths leading to lesser spaces. When the paths at a crossing are equivalent to each another, sufficient space should be provided to allow people to pause and orient themselves. The form and scale of entrances and paths should also convey the functional and symbolic distinction between public promenades, private halls, and service corridors.

人们走到路径的交点或交叉口，总是要在那里做出决定。交叉点处各条路径的连续性与尺度可以帮助人们区分通向主要空间的道路和通向次要空间的道路。当交叉口处的路径彼此相等时，需要留出足够的空间，让行人停留并辨认方向。入口与路径的形式和尺度也应该表现出公共步道、私密性大厅以及服务性走道之间功能与象征意义的差别。



The nature of the configuration of a path both influences and is influenced by the organizational pattern of the spaces it links. The configuration of a path may reinforce a spatial organization by paralleling its pattern. Or the configuration may contrast with the form of the spatial organization and serve as a visual counterpoint to it. Once we are able to map out in our minds the overall configuration of the paths in a building, our orientation within the building and our understanding of its spatial layout will be made clear.

路径的形状特点与它所联系的空间组合图案是相互影响的。平行于空间组合图案的路径形状会强化空间组合。也许路径的形状会与空间组合的形式形成对比，从而发挥视觉对应的作用。一旦我们能够在头脑中勾勒出建筑物内部路径的整个形状，我们就能对自己在建筑物中的方位、对建筑物的空间布局了如指掌。



1. Linear

All paths are linear. A straight path, however, can be the primary organizing element for a series of spaces. In addition, it can be curvilinear or segmented, intersect other paths, have branches, or form a loop.

线式

所有路径都是线式的。但是一条笔直的路径可以作为一系列空间的基本组合要素。除此之外，线式路径可以是弧线或折线，与其他路径相交，具有分支或形成环。

2. Radial

A radial configuration has linear paths extending from or terminating at a central, common point.

放射式

放射状路径是由线式路径从一个中心点向外扩展，或者若干条线式路径汇聚于一个点。

3. Spiral

A spiral configuration is a single, continuous path that originates from a central point, revolves around it, and becomes increasingly distant from it.

螺旋式

螺旋形状是一条单一的、连续的路径，从一个中心点开始，围绕中心点旋转，并且离中心点越来越远。

4. Grid

A grid configuration consists of two sets of parallel paths that intersect at regular intervals and create square or rectangular fields of space.

方格式

方格式形状包括两组平行的路径，两组平行线间距规则地相交，并形成方形或长方形的空间领域。

5. Network

A network configuration consists of paths that connect established points in space.

网络式

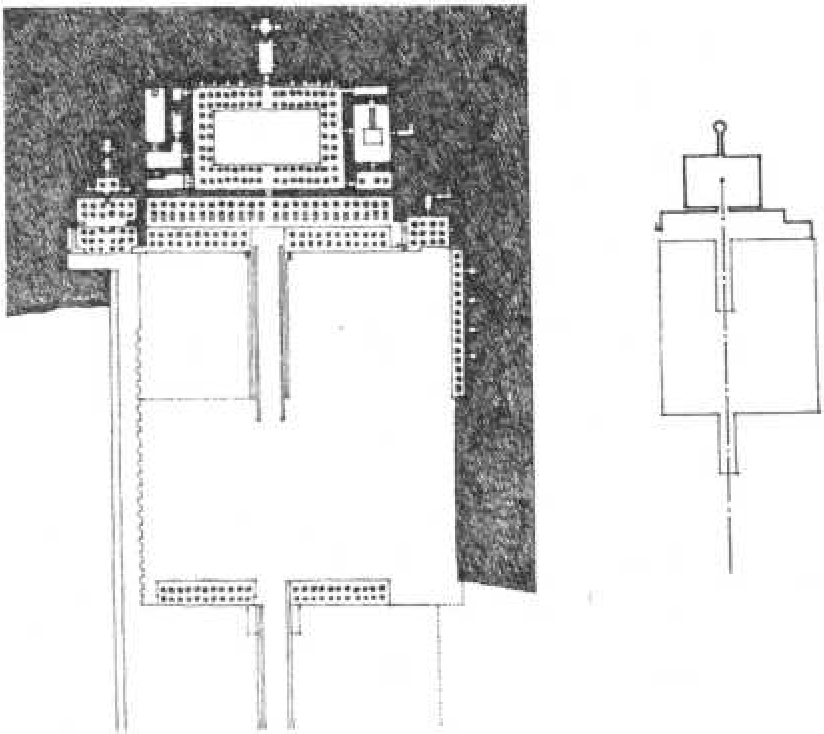
网络式形状是连接空间中固定点的若干条路径而形成的。

6. Composite

In reality, a building normally employs a combination of the preceding patterns. Important points in any pattern are centers of activity, entrances to rooms and halls, and places for vertical circulation provided by stairways, ramps, and elevators. These nodes punctuate the paths of movement through a building and provide opportunities for pause, rest, and reorientation. To avoid the creation of a disorienting maze, a hierarchical order among the paths and nodes of a building should be established by differentiating their scale, form, length, and placement.

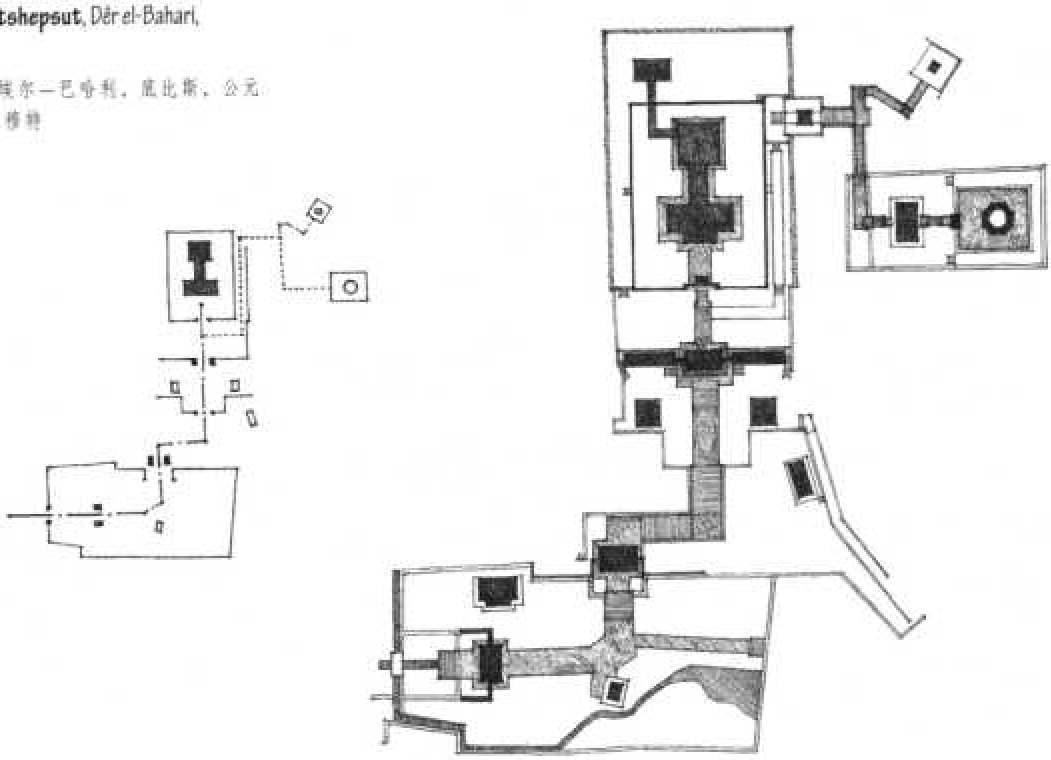
混合式

事实上，一个建筑往往综合地采用以上各种图示。任何一种图示中的重要节点都包括行为中心、通向房间和厅堂的入口，由楼梯、坡道和电梯等形成的竖向交通场所。这些节点打断了建筑物中的运动路径，并且提供了停留、休息和重新定位的机会。为了避免人们迷失方向，应该通过尺度、形式、长度和布局的不同，为建筑内部的路径与节点建立一种等级化的秩序。



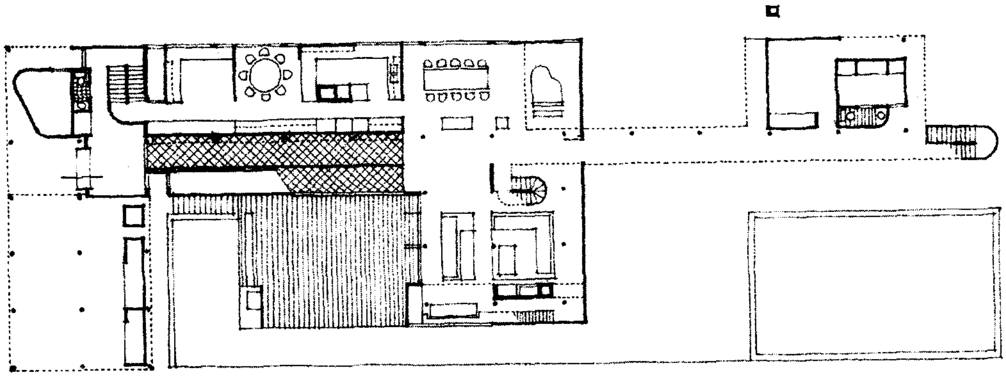
Mortuary Temple of Queen Hatshepsut, Dêr el-Bahari, Thebes, 1511–1480 B.C., Senmut

哈特什帕苏女王灵殿，戴尔·埃尔—巴哈利，底比斯，公元前1511年—公元前1480年，森穆特

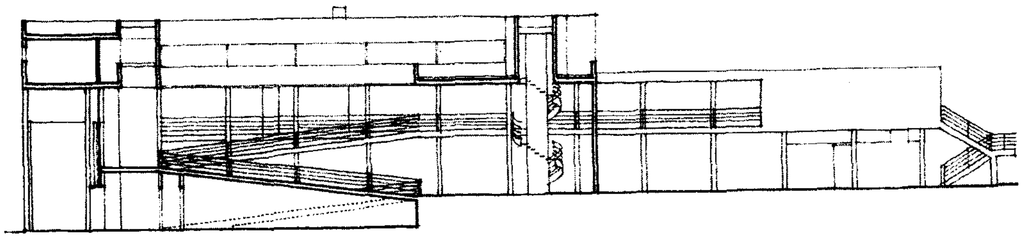


Plan of Taiyu-In Precinct of the **Toshogu Shrine**, Nikko, Tochigi Prefecture, Japan, 1636

东照宫基地总平面，日光，栃木县，日本，1636年

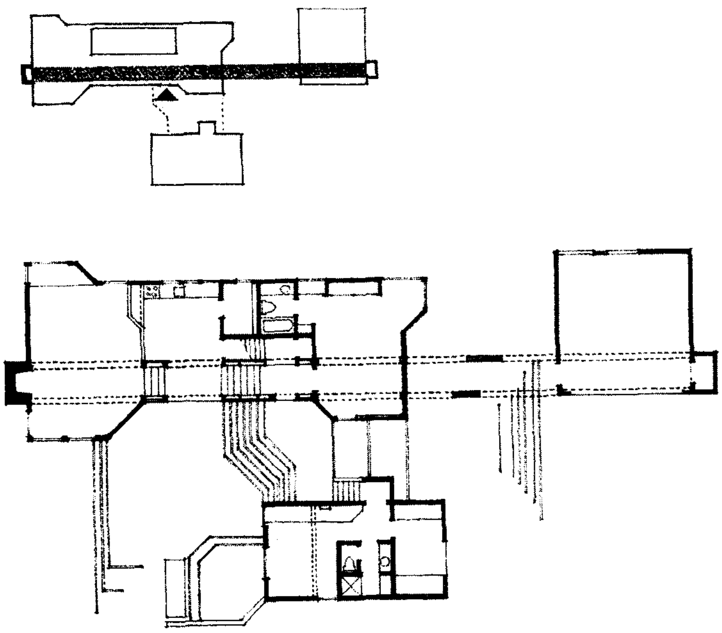


Ground Level Plan
底层平面

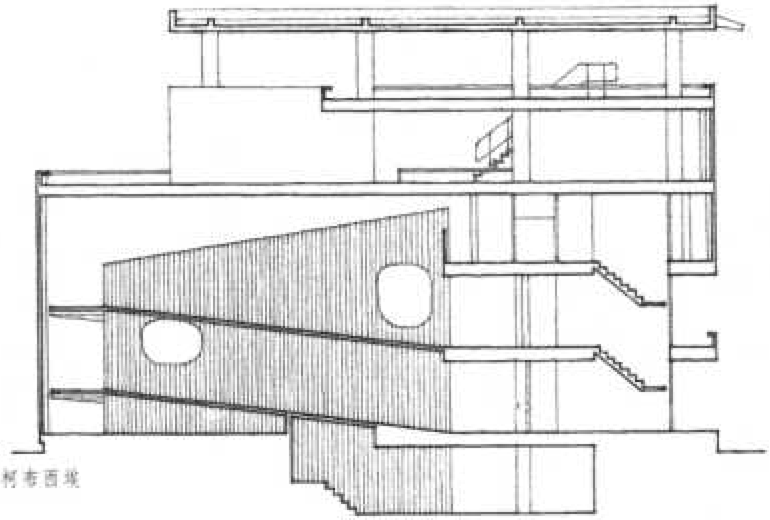


Section
剖面

House in Old Westbury, New York, 1969–1971, Richard Meier
奥德韦斯特伯里的住宅，纽约州，1969年—1971年， R.迈耶

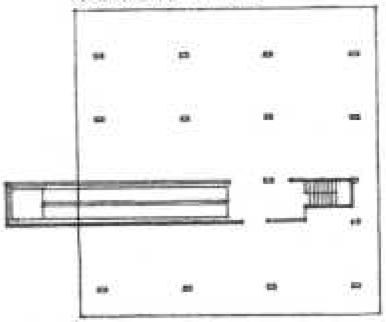


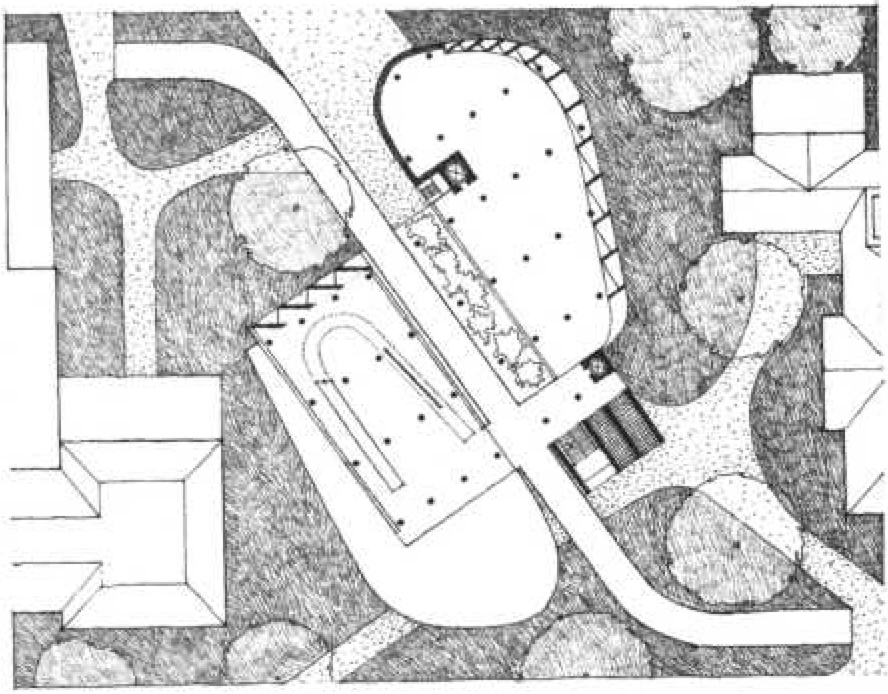
First Floor Plan, Hines House, Sea Ranch, California, 1966, MLTW/Moore and Turnbull
一层平面，海茵斯住宅，瑞奇海滨，加利福尼亚州，1966年， MLTW/穆尔和特恩布尔



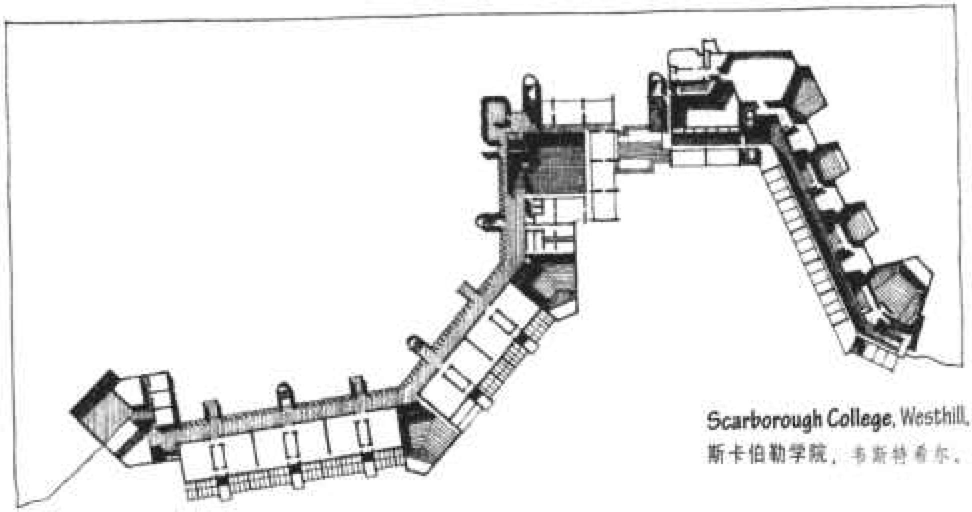
Shodhan House, Ahmedabad, India, 1956, Le Corbusier
舒德汉住宅，艾哈迈达巴德，印度，1956年，勒·柯布西埃

Section through ramp and stair
穿过坡道与楼梯的剖面

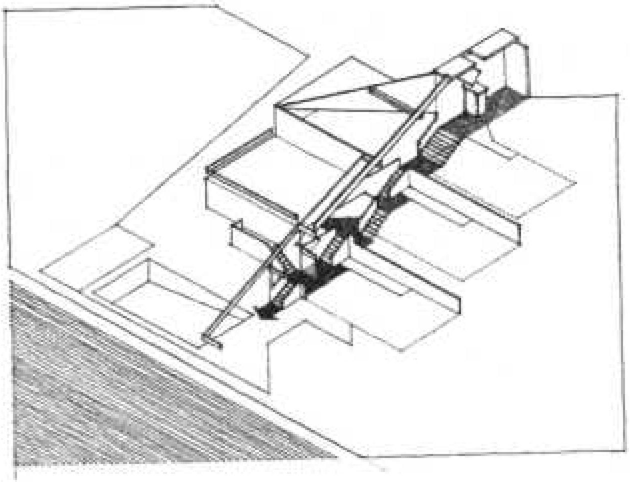




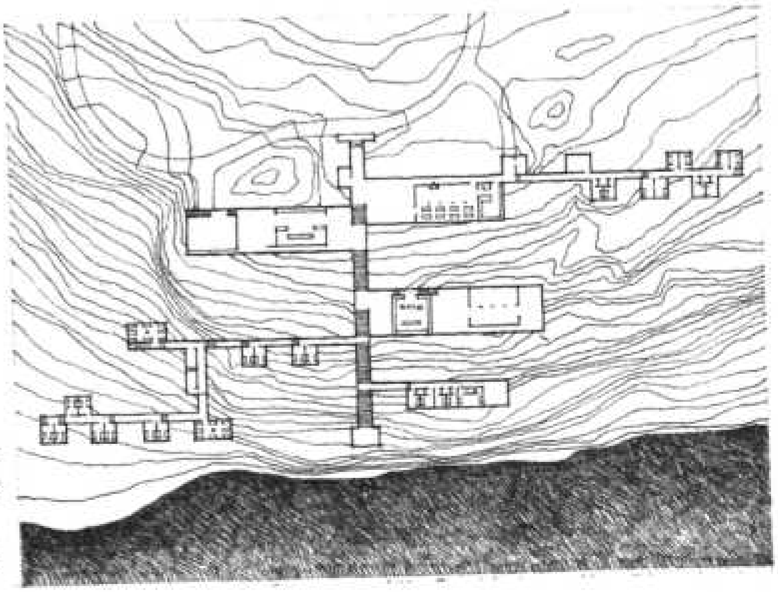
Carpenter Center for the Visual Arts,
Harvard University, Cambridge, Massachusetts,
1961–1964, Le Corbusier
卡彭特视觉艺术中心，哈佛大学，剑桥，马萨诸塞州，1961年—1964年，勒·柯布西埃



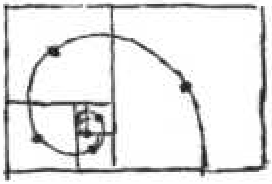
Scarborough College, Westhill, Ontario, 1964, John Andrews
斯卡伯勒学院，韦斯特希尔，安大略省，1964年，J. 安德鲁斯

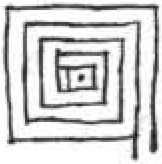


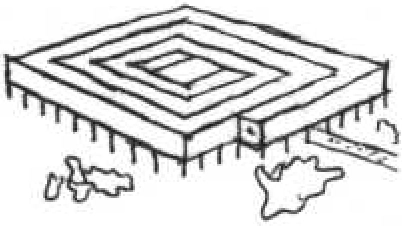
Bookstaver House, Westminster, Vermont, 1972, Peter L. Gluck
布克斯塔弗住宅，威斯敏斯特，佛蒙特州，1972年，P. L. 格拉克

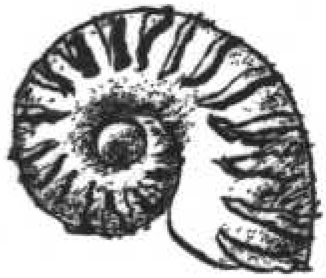


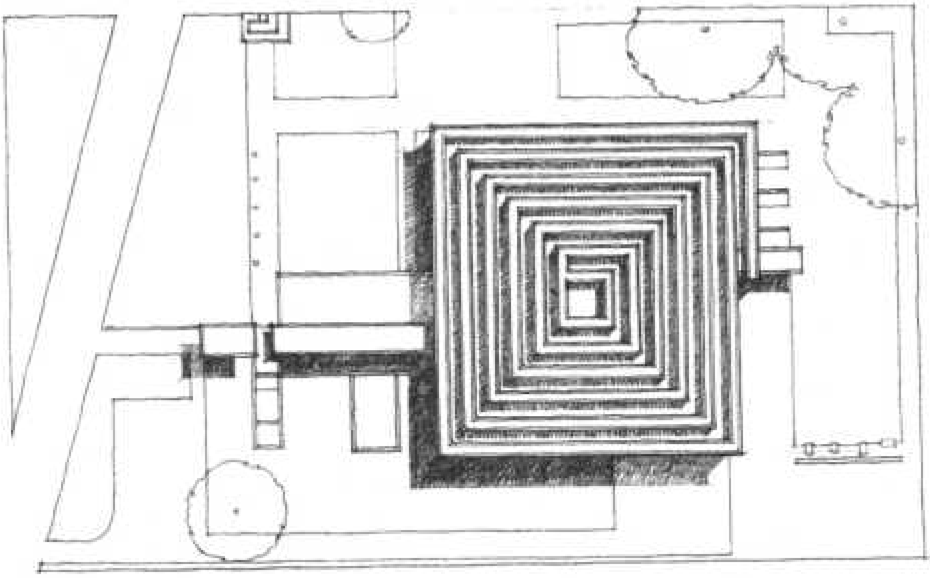
Haystack Mountain School of Arts and Crafts, Deer Isle, Maine, 1960, Edward Larrabee Barnes
干草山工艺美术学校，鹿岛，缅因州，1960年，E. L. 巴恩斯









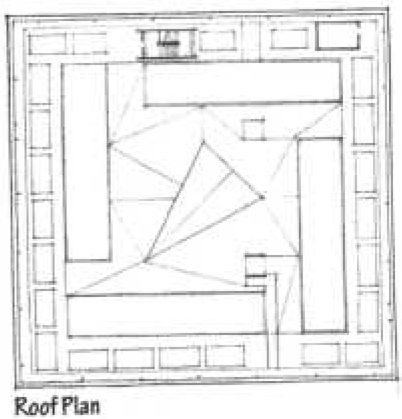


Museum of Endless Growth (Project), Philippeville, Algeria, 1939, *Le Corbusier*

无穷增大的博物馆（方案），菲利普维尔，阿尔及利亚，1939年，勒·柯布西埃



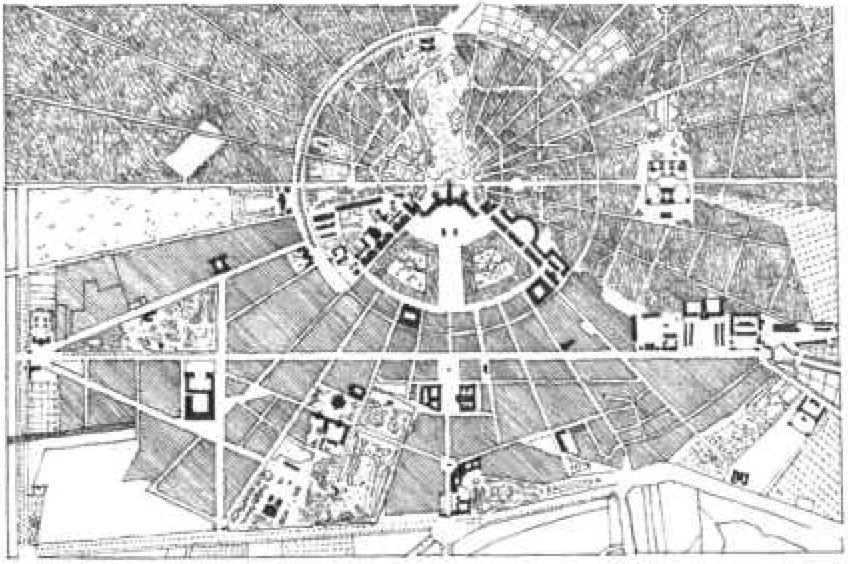
Mezzanine Plan
中层平面



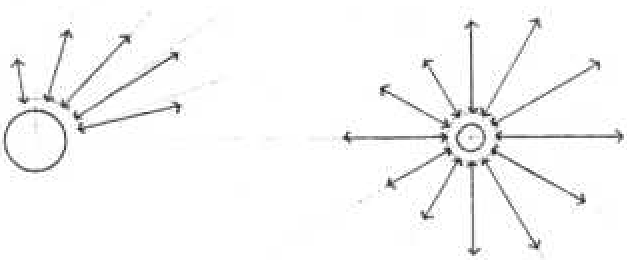
Roof Plan
屋顶平面

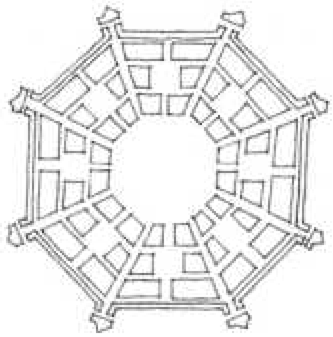
Museum of Western Art, Tokyo, 1957–1959, *Le Corbusier*

西方艺术博物馆，东京，1957年—1959年，勒·柯布西埃

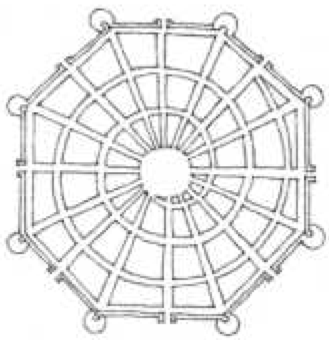


Karlsruhe, Germany, 1834
卡尔斯鲁厄，德国，1834年



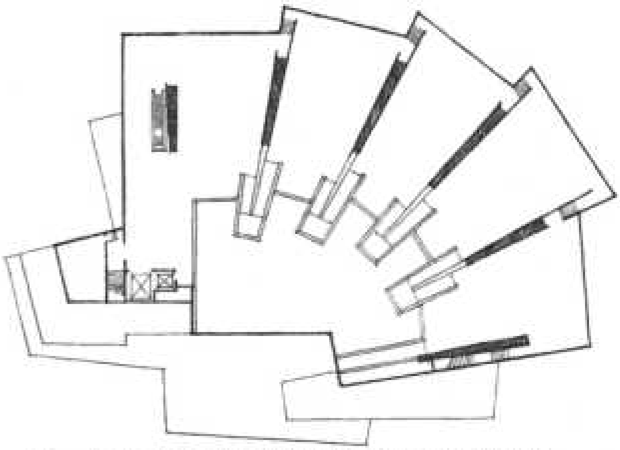


City on a Plain
平原上的城市

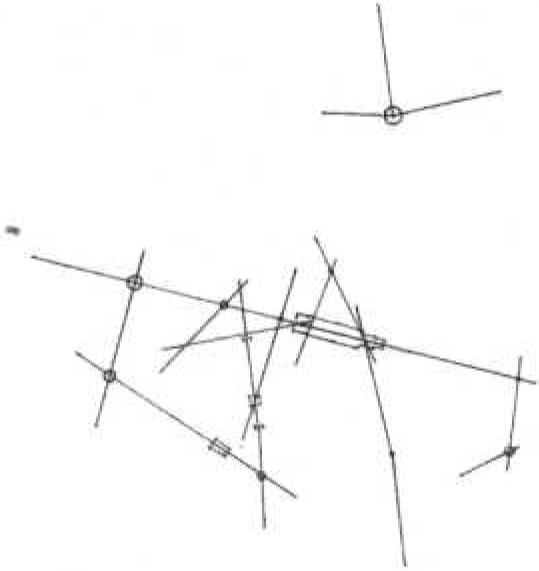


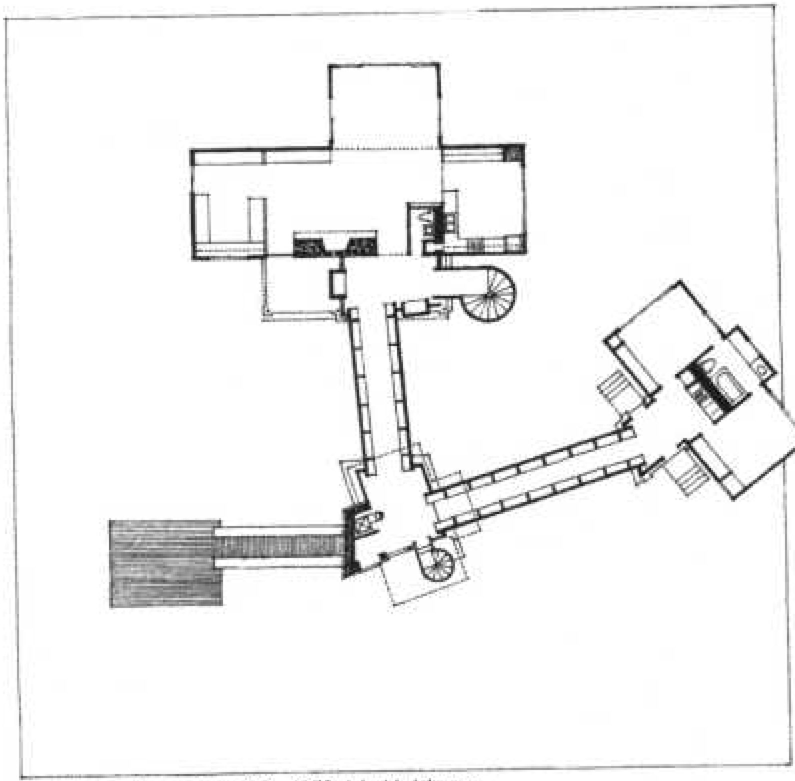
City on a Hill
山上的城市

Plans of Ideal Cities, 1451–1464, Francesco di Giorgio Martini
理想城市平面，1451年—1464年，F. 迪乔治·马提尼



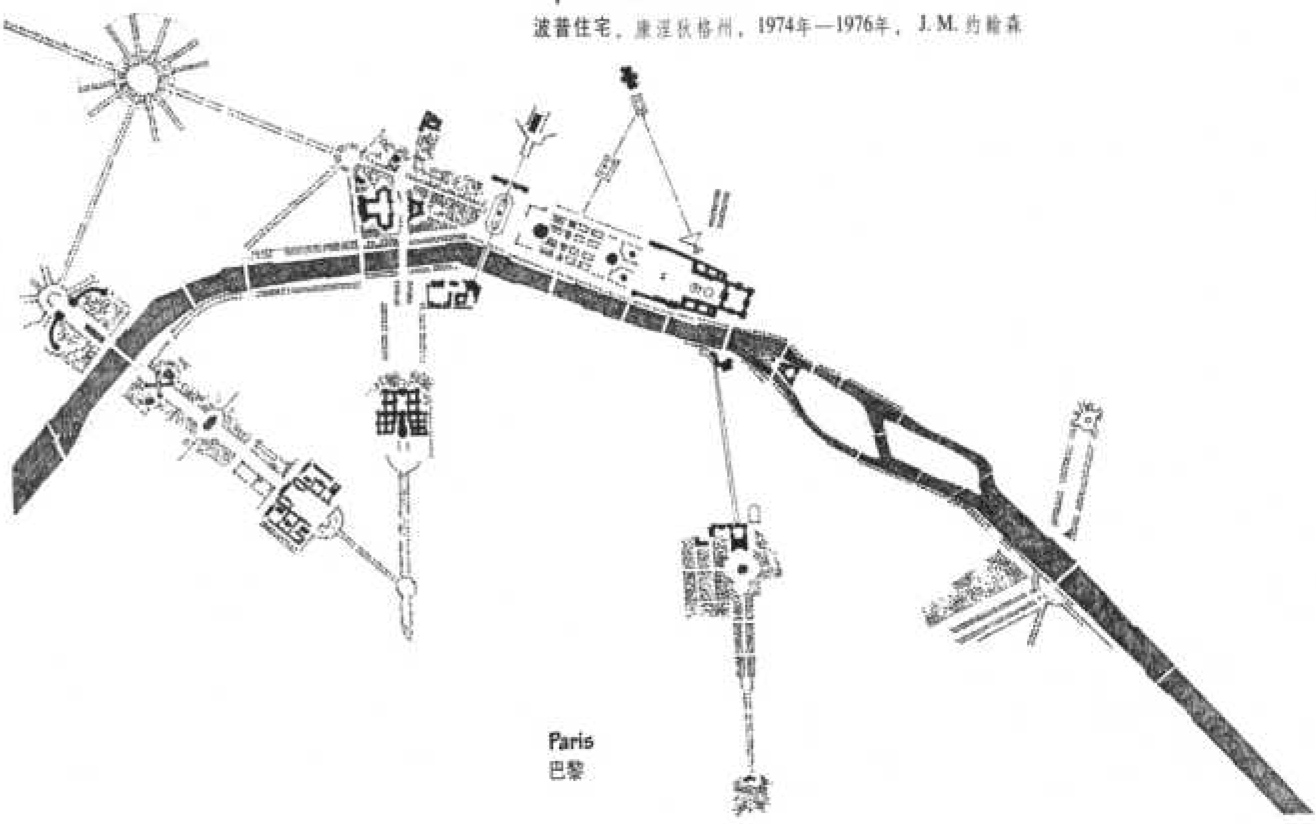
University Art Museum, University of California–Berkeley, 1971, Mario J. Ciampi and Associates
大学艺术博物馆，加州大学伯克利分校，1971年，M. J. 塞姆比及其事务所





Pope House, Connecticut, 1974–1976, John M. Johansen

波普住宅，康涅狄格州，1974年—1976年，J. M. 约翰森



Paris

巴黎



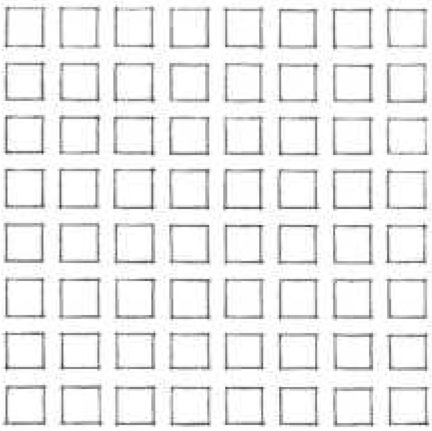
Yi Yuan (*Garden of Contentment*), Suzhou, China, Qing Dynasty, 19th century

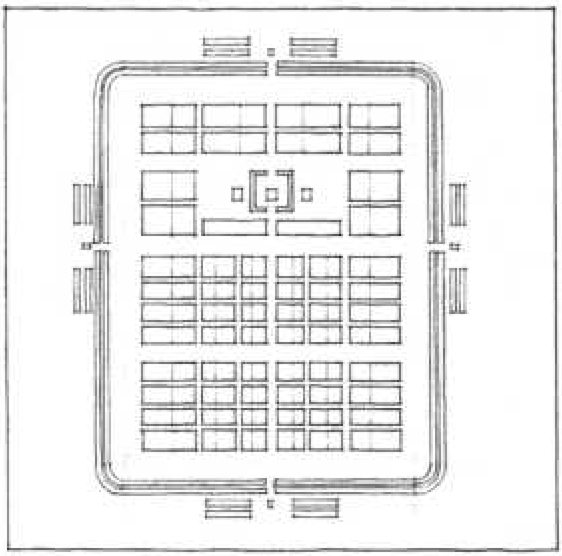
宜园，苏州，中国，清代，19世纪



Plan for Washington, D.C., 1792, Pierre L'Enfant

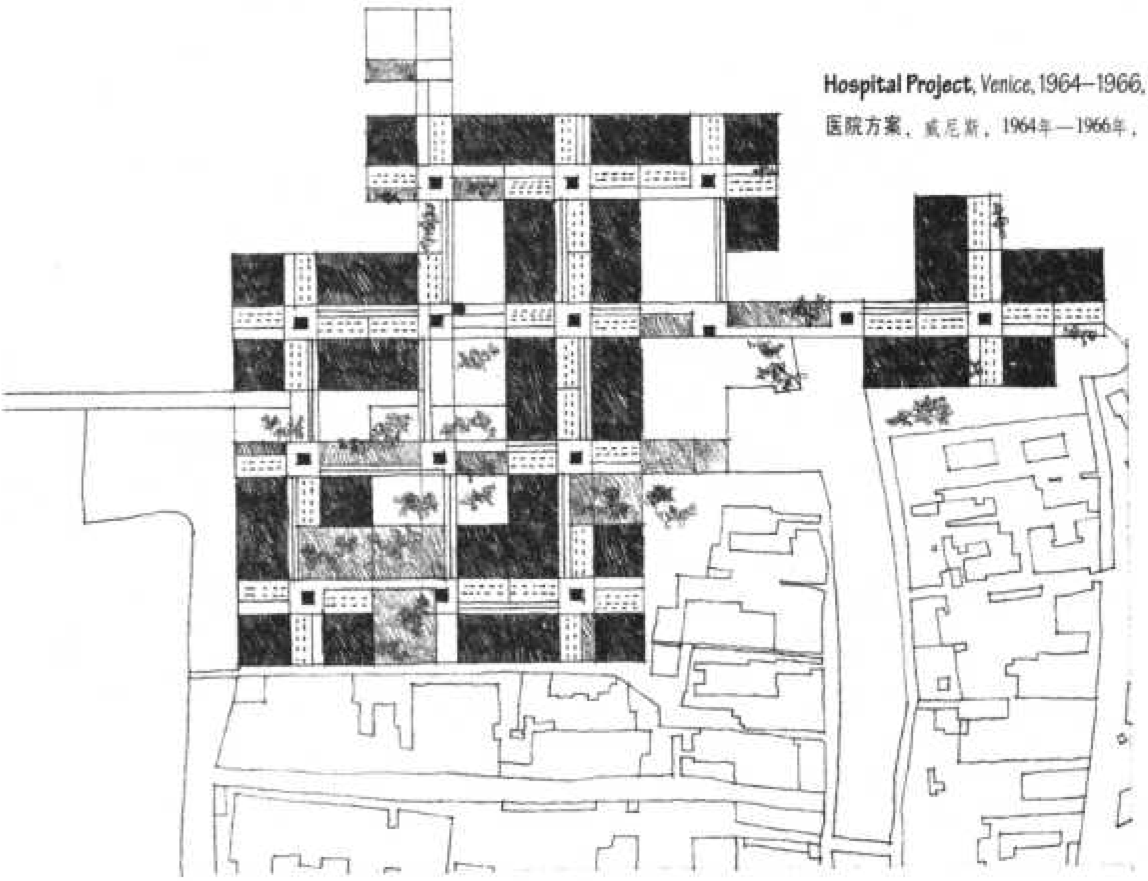
华盛顿特区平面，1792年，P.朗方特





Typical Layout for a **Roman Camp**, c. 1st century A.D.

典型的**古罗马营地**布局，1世纪

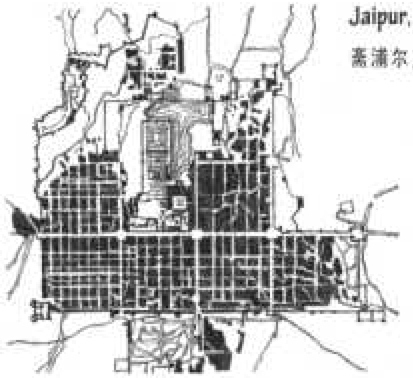


Hospital Project, Venice, 1964–1966, Le Corbusier

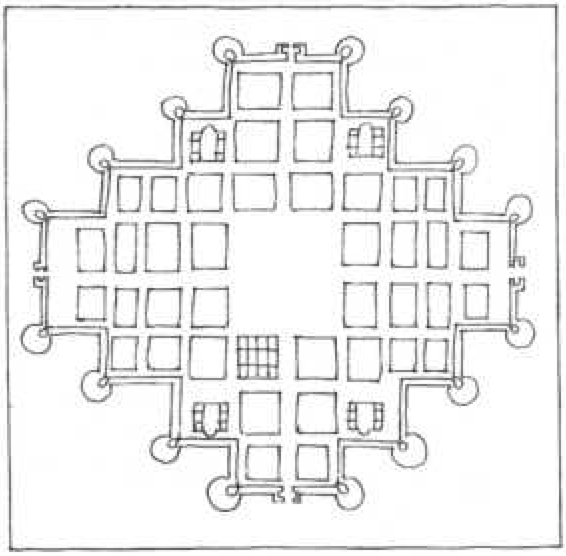
医院方案，威尼斯，1964年—1966年，勒·柯布西埃



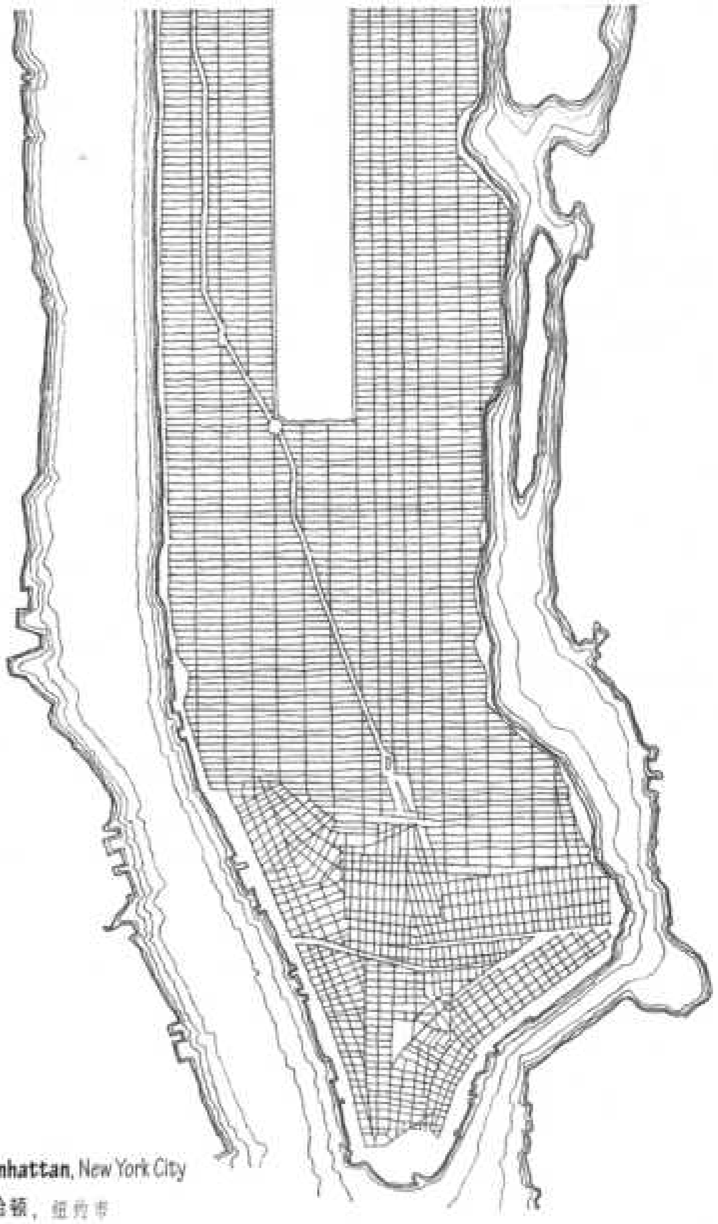
Priene, founded 4th century B.C.
布林恩城，建于公元前4世纪



Jaipur, India, 1728
斋浦尔，印度，1728年



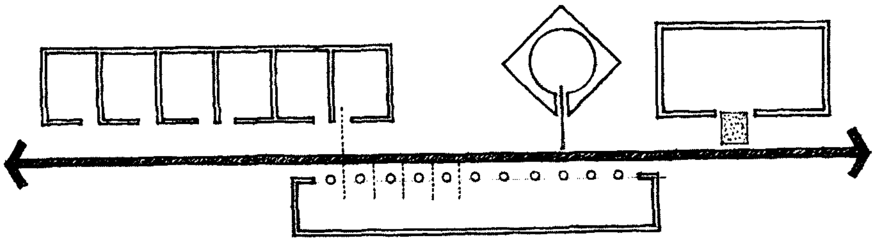
Plan of an Ideal City, 1451–1464, Francesco di Giorgio Martini
理想城市平面，1451年—1464年，F.迪乔治·马提尼



Manhattan, New York City
曼哈顿，纽约市

Paths may be related to the spaces they link in the following ways. They may:

路径可以下列方式与它们所连接的空间发生关系：

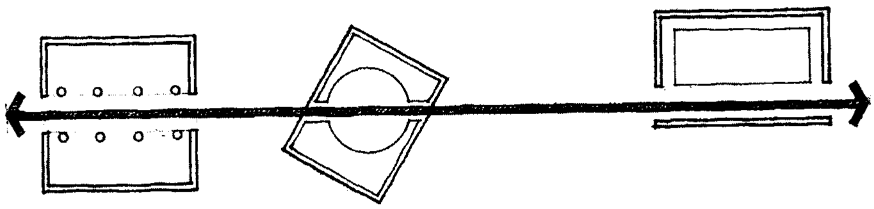


Pass by Spaces

- The integrity of each space is maintained.
- The configuration of the path is flexible.
- Mediating spaces can be used to link the path with the spaces.

从空间旁边经过

- 各个空间仍保持整体性。
- 路径的形状是灵活多变的。
- 可用过渡空间来连接路径与空间。



Pass through Spaces

- The path may pass though a space axially, obliquely, or along its edge.
- In cutting through a space, the path creates patterns of rest and movement within it.

从空间内部穿过

- 路径可以轴向、斜向或沿着边缘穿越空间。
- 在穿越空间时，路径在空间中形成休息与运动的不同图示。

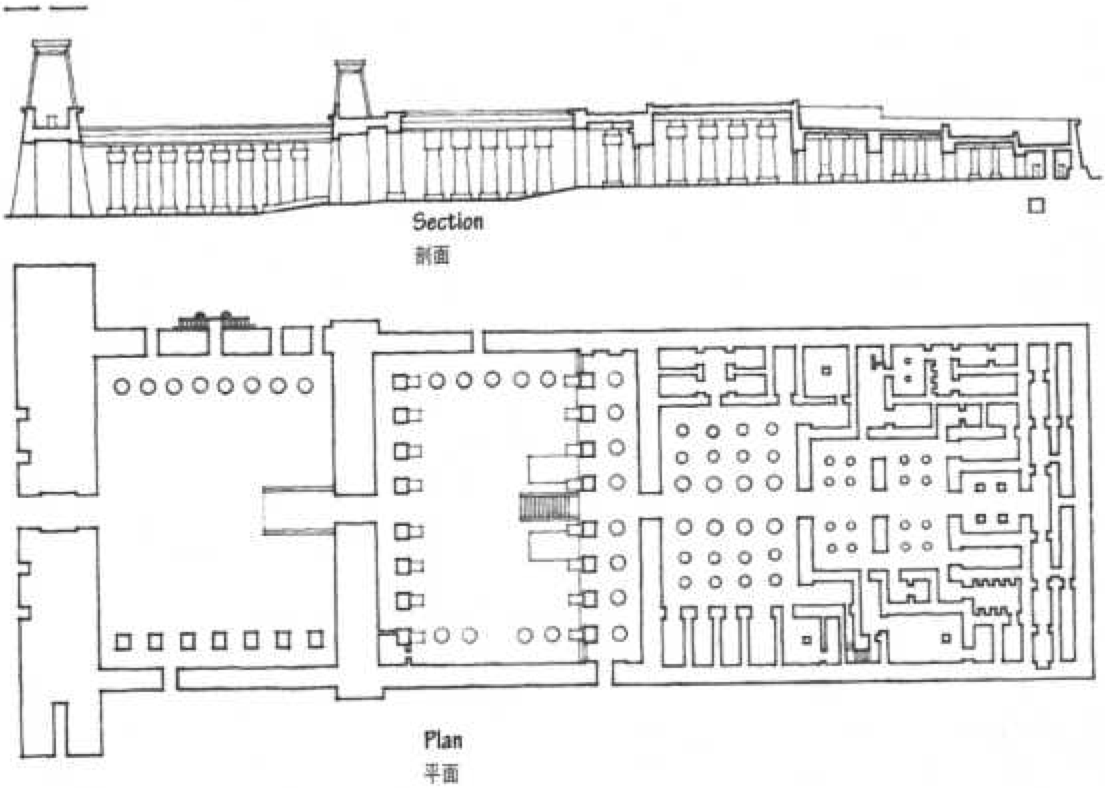


Terminate in a Space

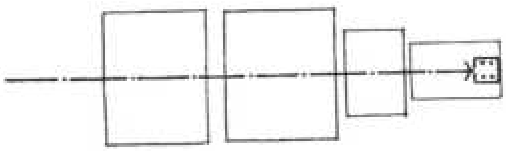
- The location of the space establishes the path.
- This path-space relationship is used to approach and enter functionally or symbolically important spaces.

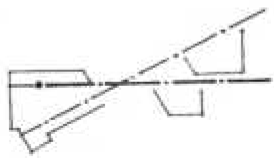
终止于一个空间

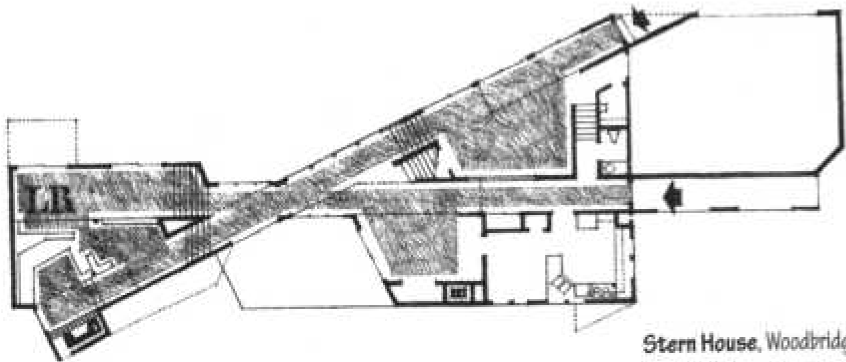
- 空间的位置确定了路径。
- 这种路径与空间的关系用于走向或进入重要的功能空间或重要的象征性空间。



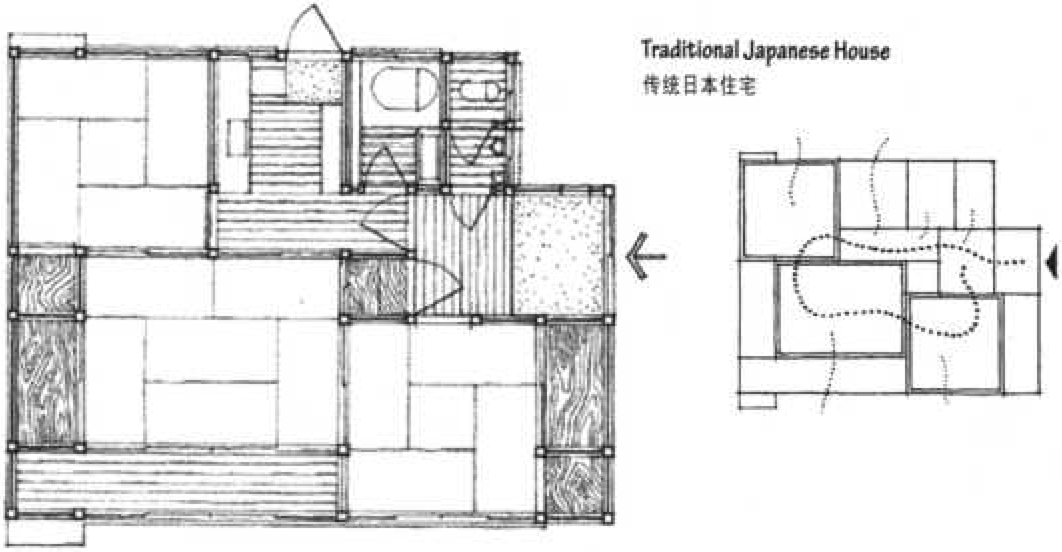
Mortuary Temple of Rameses III, Medinet-Habu, 1198 B.C.
拉美西斯三世灵殿，梅迪纳特—哈布，公元前1198年



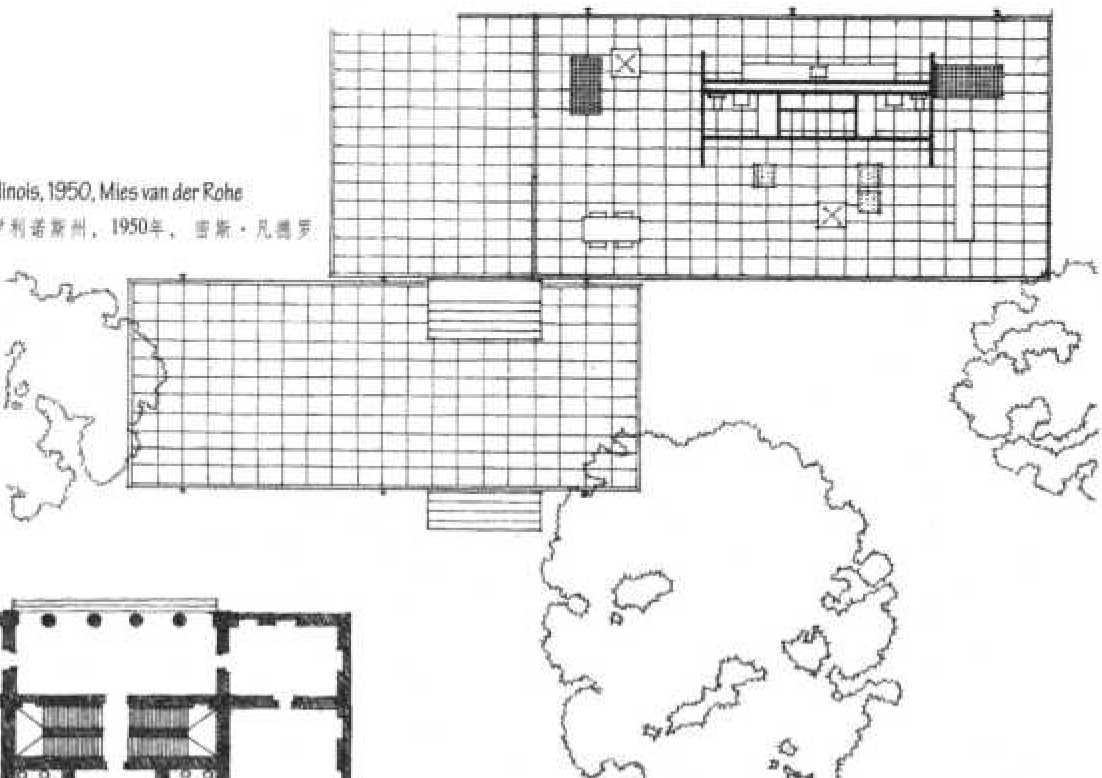




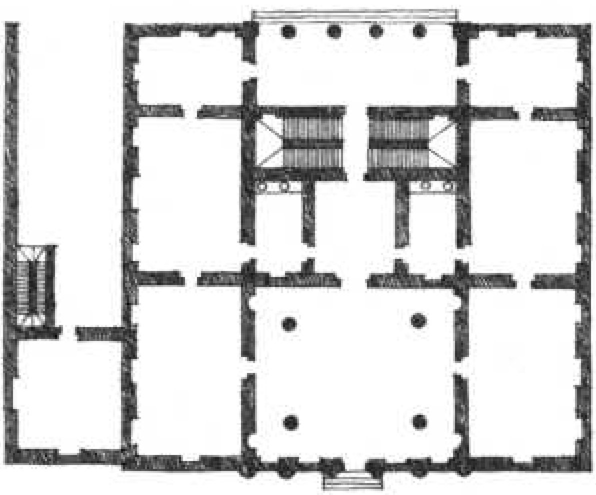
Stern House, Woodbridge, Connecticut, 1970, Charles Moore Associates
斯特恩住宅，伍德布里奇，康涅狄格州，1970年，C. 穆尔事务所



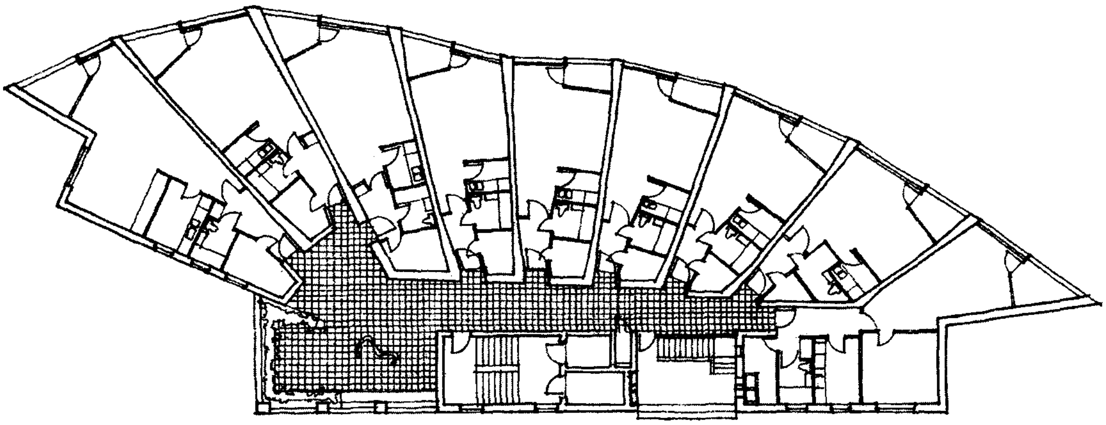
Traditional Japanese House
传统日本住宅



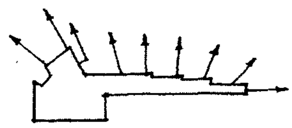
Farnsworth House, Plano, Illinois, 1950, *Mies van der Rohe*
范斯沃斯住宅，普莱诺，伊利诺斯州，1950年，密斯·凡德罗

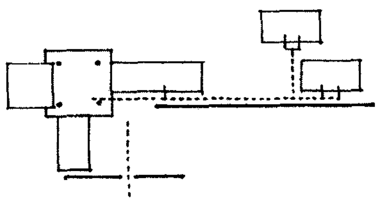


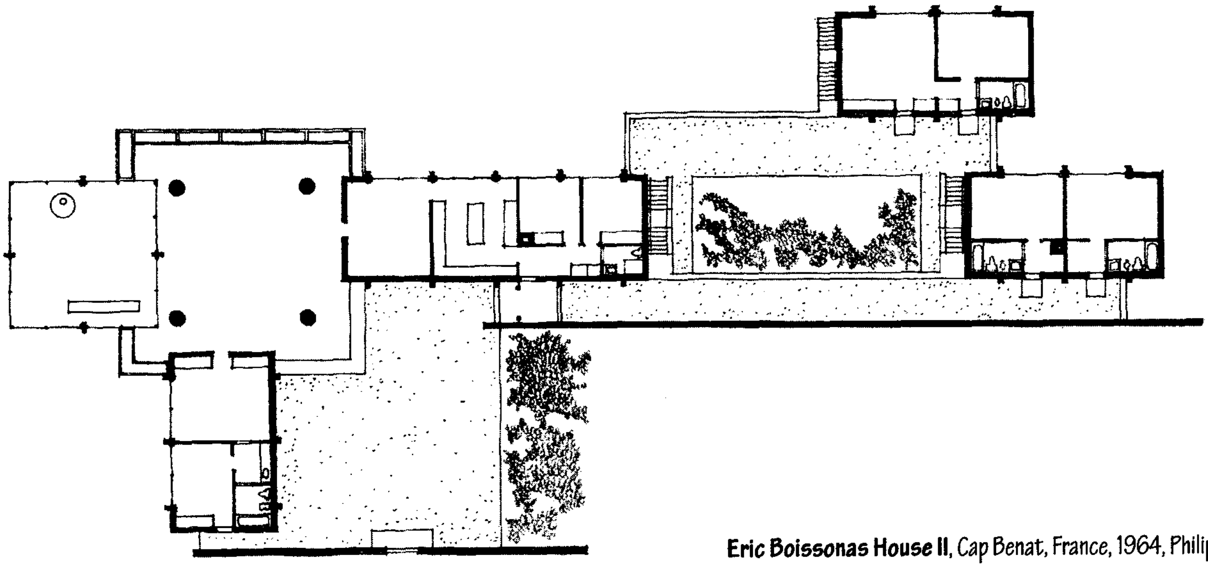
Palazzo Antonini, Udine, Italy, 1556, Andrea Palladio
安东尼尼宫，乌迪内，意大利，1556年，A. 帕拉第奥



Neur Vahr Apartment Building, Bremen, Germany, 1958–1962, Alvar Aalto
纽瓦公寓大楼，不来梅，德国，1958年—1962年， A.阿尔托







Eric Boissonas House II, Cap Benat, France, 1964, Philip Johnson
E.勃逊纳斯二号住宅，贝纳角，法国，1964年， P.约翰逊



After a drawing by William R. Ware of a vaulted staircase

穹顶楼梯间，根据W. R. 维尔的图绘制

Spaces for movement form an integral part of any building organization and occupy a significant amount of the volume of a building. If considered merely as functional linking devices, then circulation paths would be endless, corridor-like spaces. The form and scale of a circulation space, however, should accommodate the movement of people as they promenade, pause, rest, or take in a view along a path.

交通空间是任何建筑组合中不可分割的一部分，并在建筑物的容积中占有相当的空间。如果把它仅仅看成是具有联系功能的设施，那么交通路径只不过是一些没有尽头的廊道式空间而已。然而，交通空间必须满足人们沿途散步、停留、休息或赏景的需要。

The form of a circulation space varies according to how:

- its boundaries are defined
- its form relates to the form of the spaces it links
- its qualities of scale, proportion, light, and view are articulated
- entrances open onto it
- it handles changes in level with stairs and ramps

交通空间的形式变化依据以下几点：

- 其边界是如何限定的
- 其形式与它所连接的空间形体的关系如何
- 其尺度、比例、采光、景观等特点是如何表达的
- 入口是如何向交通空间敞开的
- 交通空间中是如何利用楼梯和坡道来处理高程变化的

A circulation space may be:

交通空间可能是：

Enclosed

forming a public galleria or private corridor that relates to the spaces it links though entrances in a wall plane;

封闭的

形成公共廊道或私密的走廊，并通过墙面上的入口，与其所连接的空间发生关系；

Open on One Side

forming a balcony or gallery that provides visual and spatial continuity with the spaces it links;

一边开敞

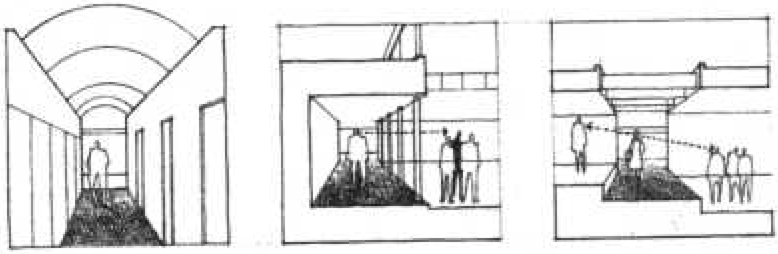
形成平台或展廊，为它所连接的空间提供视觉与空间联系；

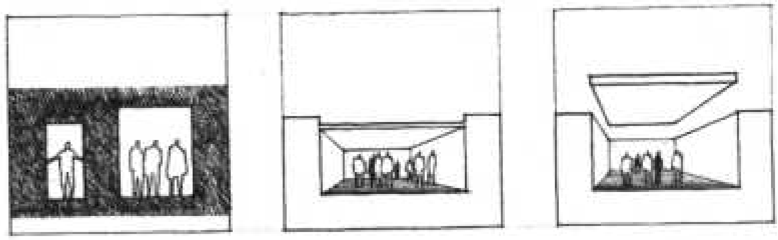
Open on Both Sides

forming a colonnaded passageway that becomes a physical extension of the space it passes through.

两边开敞

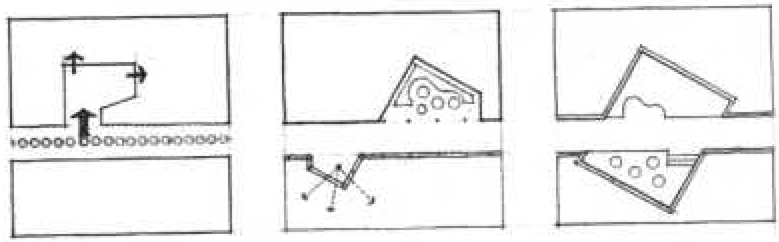
形成柱廊，并使其成为所穿越空间的实际延伸部分。





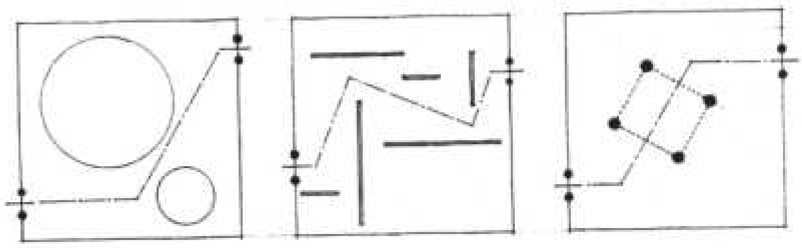
The width and height of a circulation space should be proportionate with the type and amount of movement it must handle. A distinction in scale should be established between a public promenade, a more private hall, and a service corridor.

交通空间的高度和宽度应当与交通量和交通方式成比例。在公共步道或更加私密的厅堂与服务性走廊之间应该形成尺度的差别。



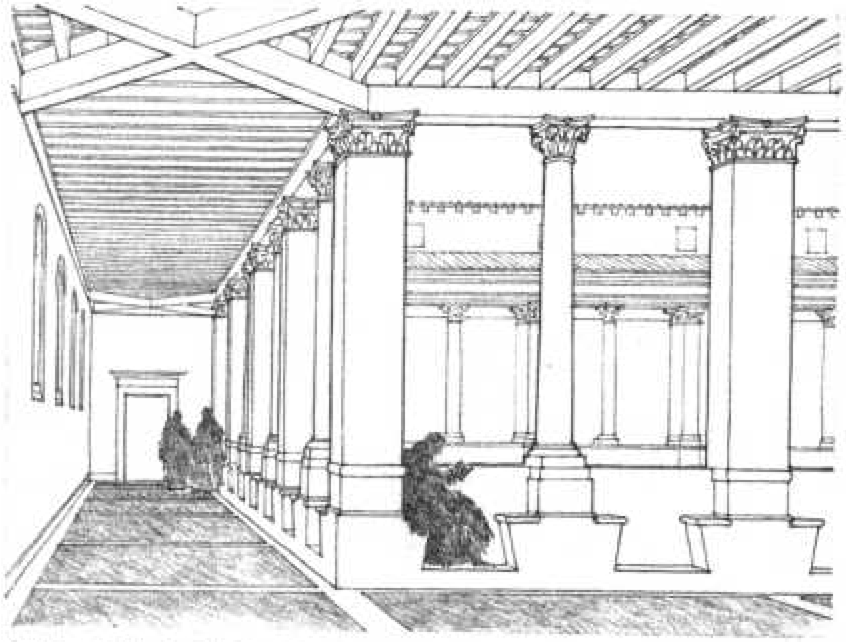
A narrow, enclosed path naturally encourages forward motion. To accommodate more traffic as well as to create spaces for pausing, resting, or viewing, sections of a path can be widened. The path can also be enlarged by merging with the spaces it passes through.

狭窄封闭的通道自然能促使人们向前走。为了容纳更大的交通量，同时创造停留、休息或观景的空间，路径的侧面可以加宽。路径还可以与它所穿越的空间合并而加宽。



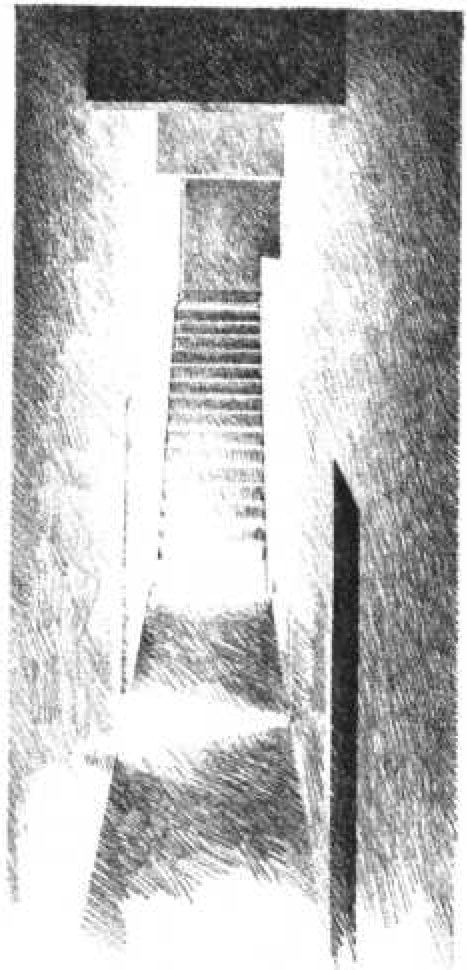
Within a large space, a path can be random, without form or definition, and be determined by the activities and arrangement of furnishings within the space.

在一个大空间中路径可以是任意的，既无形状又无边界，而是决定于空间中的行为与家具布置。



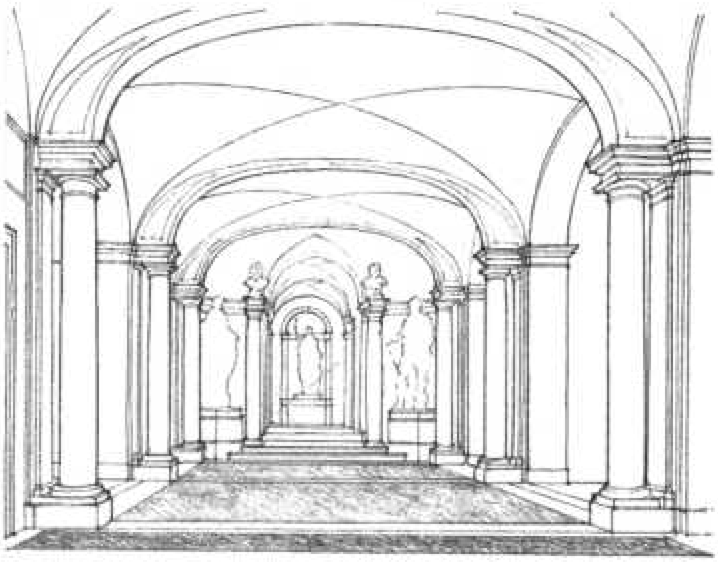
Cloister of S. Maria della Pace, *Rome, 1500–1504, Donato Bramante*

圣玛丽亚·德拉·佩斯修道院，罗马，1500年—1504年，D.伯拉孟特



Hallway of Okusu Residence, *Todoroki, Tokyo, 1976–1978, Tadao Ando*

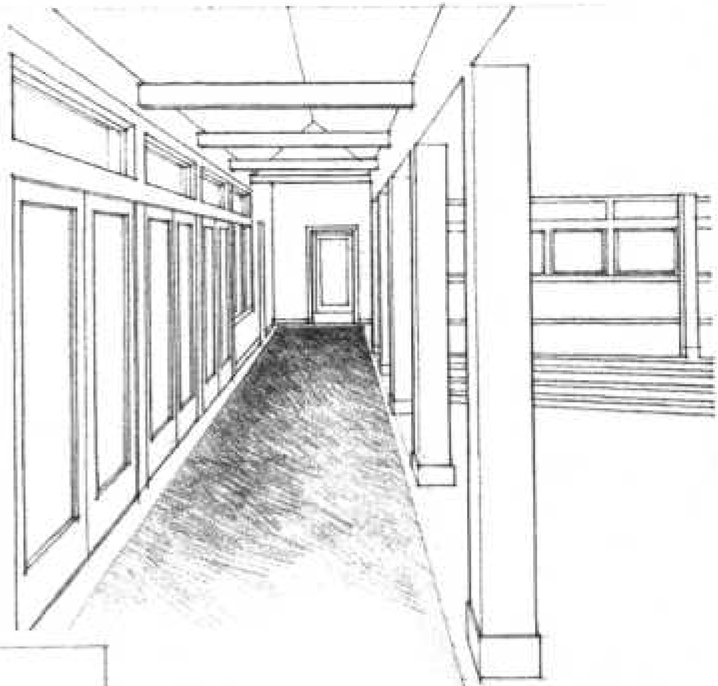
奥州住宅走廊，等等力，东京，1976年—1978年，安藤忠雄



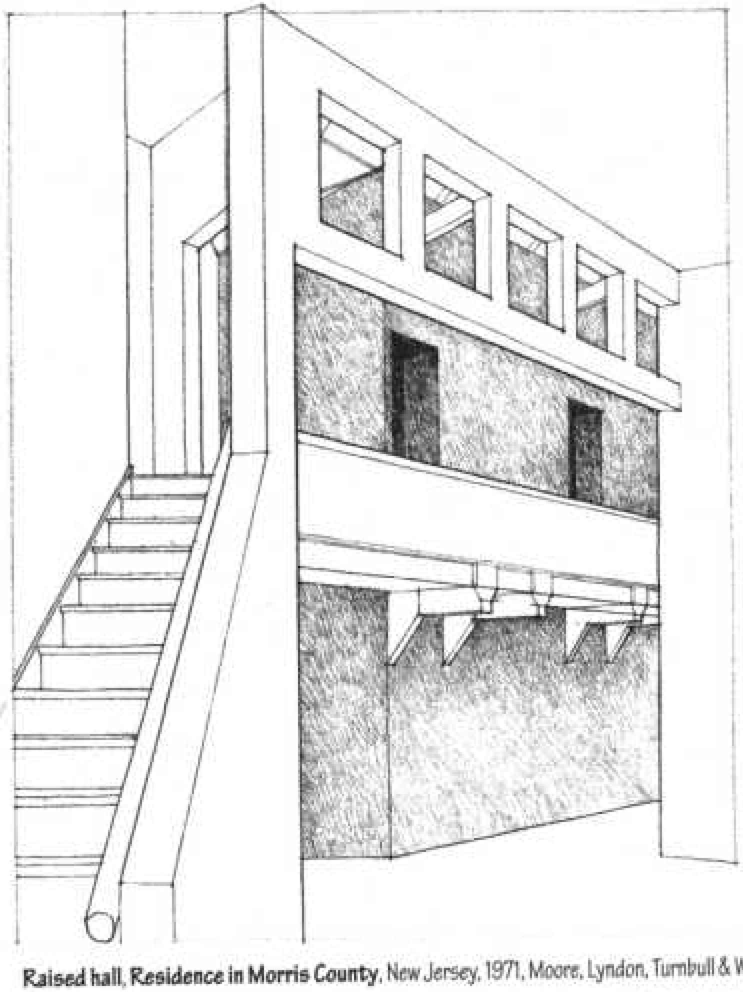
Vestibule of Renaissance Palace

文艺复兴式宫殿的前厅

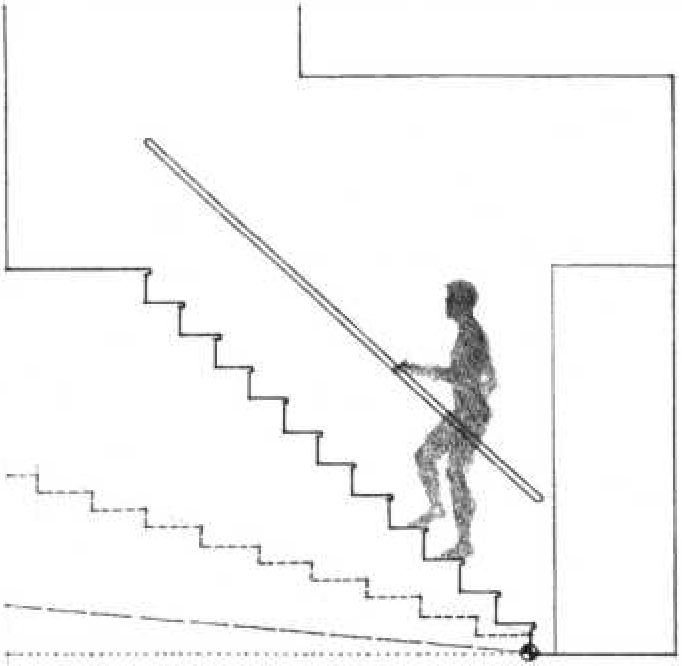
Examples of various forms of spaces used for movement through a building.
各种穿越建筑的交通空间形式的实例。



A hall opening through a colonnade onto an interior space and through a series of French doors onto an exterior courtyard.
大厅通过柱廊向室内空间开放，并且通过一系列法国式门扇向室外庭院开敞。

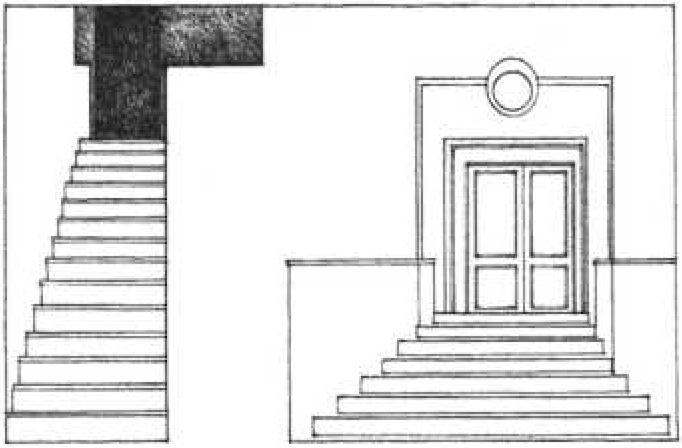


Raised hall, Residence in Morris County, New Jersey, 1971, Moore, Lyndon, Turnbull & Whitaker
抬高了的大厅，莫里斯县的住宅，新泽西州，1971年，穆尔、林登、特恩布尔及惠特克



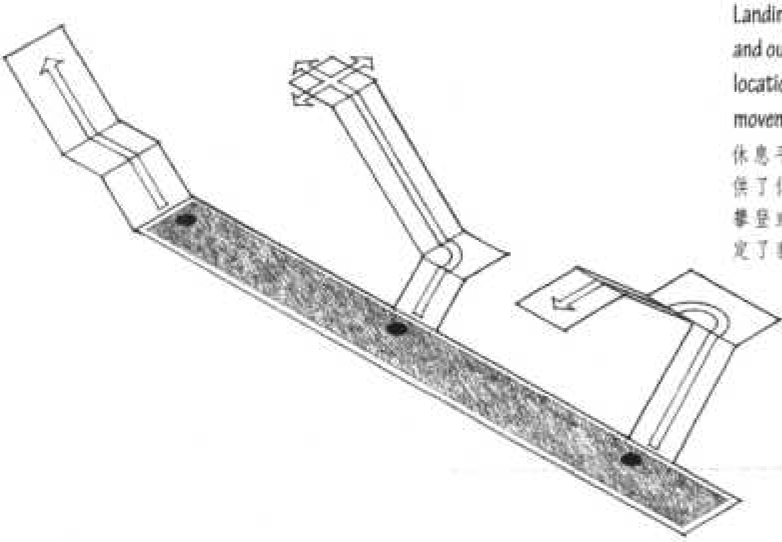
Stairs and stairways provide for our vertical movement between the levels of a building or outdoor space. The slope of a stairway, determined by the dimensions of its risers and treads, should be proportioned to fit our body movement and capability. If steep, a stair can make ascent physically tiring as well as psychologically forbidding, and can make descent precarious. If shallow, a stair must have treads deep enough to fit our stride.

在建筑物内或室外环境中，台阶与楼梯为我们提供了不同高程之间的竖向运动。楼梯的坡度决定于其踢面与踏面的尺寸，其比例应适合人体的运动以及人体的能力。若坡度过陡，台阶会产生攀登时出现的身体疲劳感，同时也会在心理上产生禁止攀登的感觉，下来时也不安全。如果坡度缓，台阶的踏面必须足够宽，以适合人们行走。



A stairway should be wide enough to comfortably accommodate our passage as well as any furnishings and equipment that must be moved up or down the steps. The width of a stairway also provides a visual clue to the public or private nature of the stairway. Wide, shallow steps can serve as an invitation, while a narrow, steep stairway can lead to more private places. While the act of traversing up a stairway may convey privacy, aloofness, or detachment, the process of going down can imply moving toward secure, protected, or stable ground.

楼梯必须足够宽，以使我们穿行舒适，同时还要满足那些必须上下搬运的家具与设备的要求。楼梯的宽度也为楼梯的属性是公共的还是私密的提供了视觉线索。宽阔、平缓的台阶能向人提出邀请，而狭窄，陡峭的楼梯则通向更加私密的场所。
上楼梯的行为可能传递的是私密性、超然或冷漠，而下楼梯的过程则暗示着向安全推进、受到保护或脚踏实地。

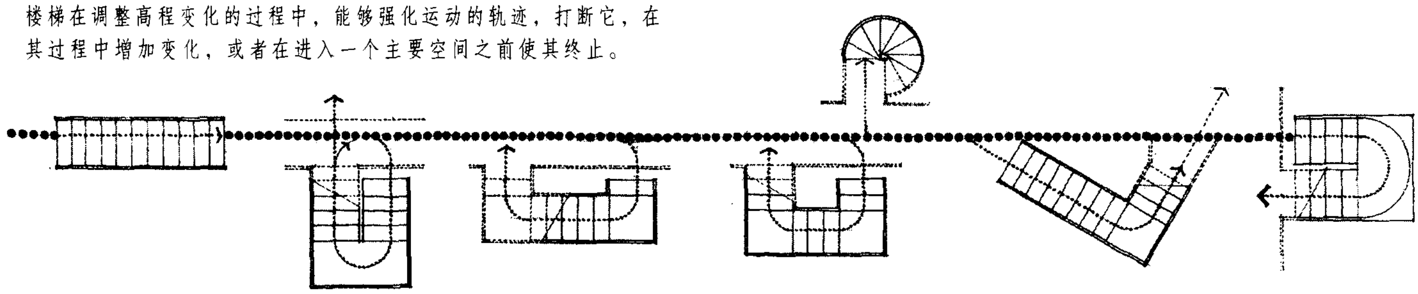


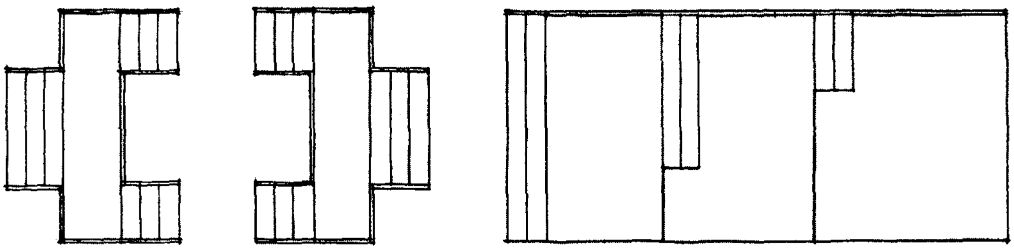
Landings interrupt the run of a stair and enable it to change direction. Landings also provide opportunities for rest and possibilities for access and outlook from the stairway. Together with the pitch of a stair, the locations of landings determine the rhythm and choreography of our movements as we ascend or descend its steps.

休息平台打断了楼梯段，使楼梯可以改变方向。休息平台也提供了休息的机会，以及从楼梯上接近和观景的可能性。当我们攀登或走下阶梯的时候，休息平台的位置与楼梯的斜度一起决定了我们动作的节奏与旋律。

Stairs, in accommodating a change in level, can reinforce the path of movement, interrupt it, accommodate a change in its course, or terminate it prior to entering a major space.

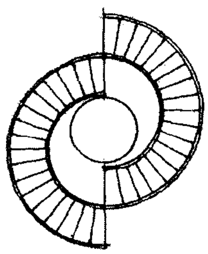
楼梯在调整高程变化的过程中，能够强化运动的轨迹，打断它，在其过程中增加变化，或者在进入一个主要空间之前使其终止。

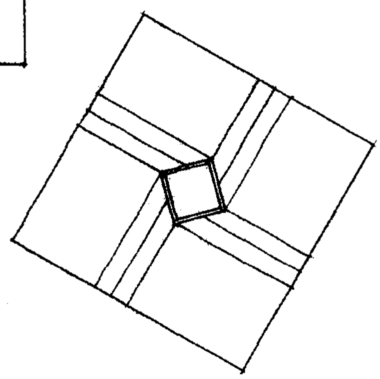




The configuration of a stairway determines the direction of our path as we ascend or descend its steps. There are several basic ways in which to configure the runs of a stairway.

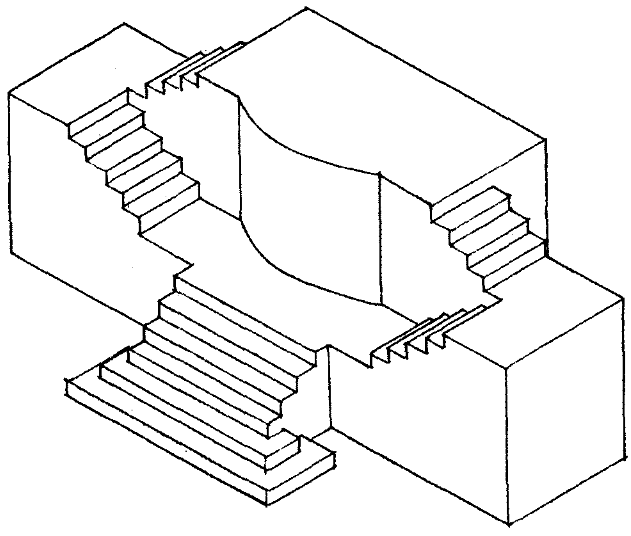
当我们攀登或走下其阶梯时，楼梯的形状决定了我们行走路径的方向。设计楼梯的形状有以下几种基本的方式：

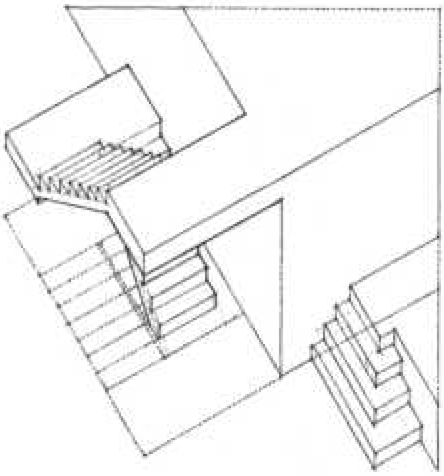




- straight-run stair
- L-shaped stair
- U-shaped stair
- circular stair
- spiral stair

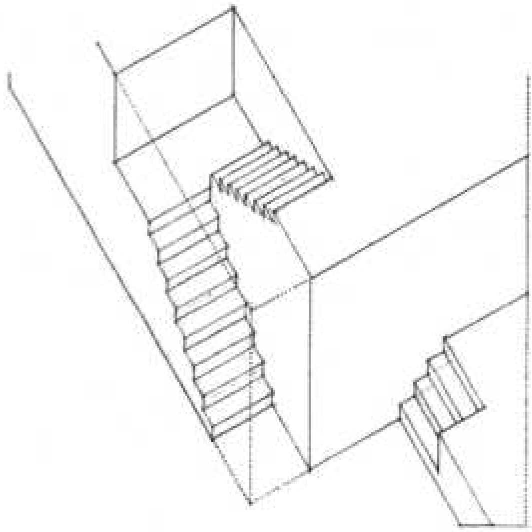
- 直跑楼梯
- L形楼梯
- U形楼梯
- 圆形楼梯
- 螺旋楼梯

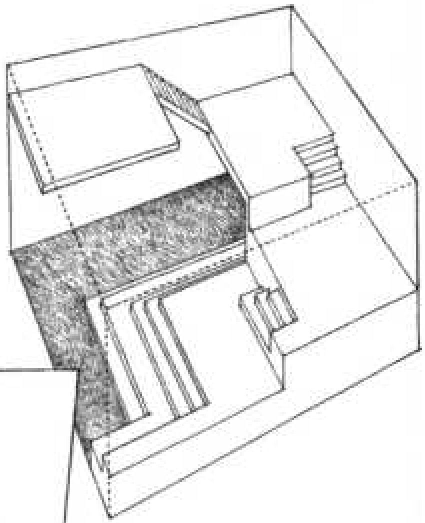




The space a stairway occupies can be great, but its form can be fitted into an interior in several ways. It can be treated as an additive form or as a volumetric solid from which space for movement as well as rest have been carved out.

虽然楼梯占据的空间会很大，但是有几种方法可以使楼梯的形式与室内相适应。它可以被看作附加形体，也可以被当成有体量的物体，在其形体上塑造出运动空间以及休息空间。



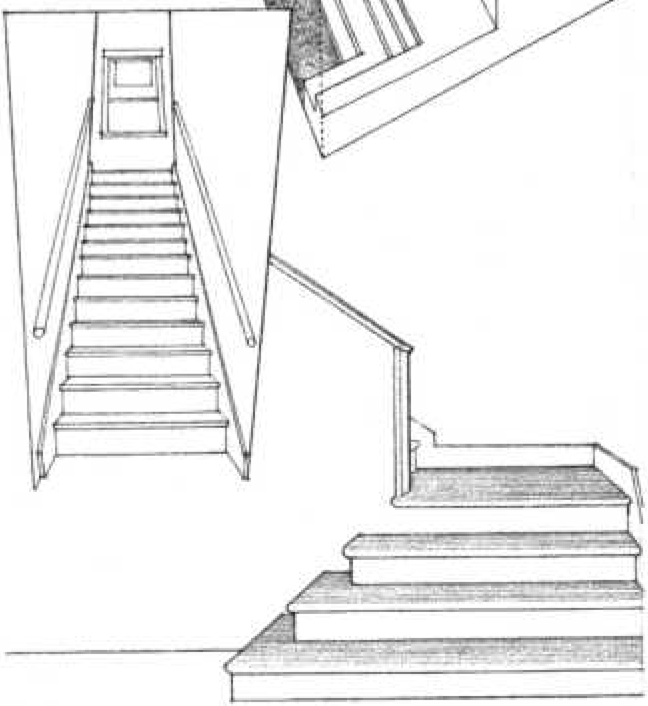


The stairway can run along one of the edges of a room, wrap around the space, or fill its volume. It can be woven into the boundaries of a space or be extended into a series of platforms for seating or terraces for activity.

楼梯可以沿着一个房间的边缘布置，环绕空间或填充其容积。它可以与空间的边界交织在一起，或者延伸成一系列坐椅平台及表演露台。

A stairway can be an organizing element and meander through and weave together a series of spaces at different levels of a building or outdoor space.

楼梯可以作为一个组织要素穿梭于建筑物的一系列高程不同的室内或室外空间之中，并使它们交织在一起。



Landings which are visible on approach invite ascent, as do treads which spill out at the bottom of a stairway. On the other hand, to offer access to a private place or signify unapproachability, the path of a stair can rise steeply between walls through a narrow shaft of space.

在通道上能够看到的休息平台具有邀请人们攀登的意味，在楼梯底端突出的踏板的含义也是如此。相反，接近一个私密性场所或不可接近的要害部门，楼梯的通道可以穿过一窄条空间，在两墙之间陡峭地升起。

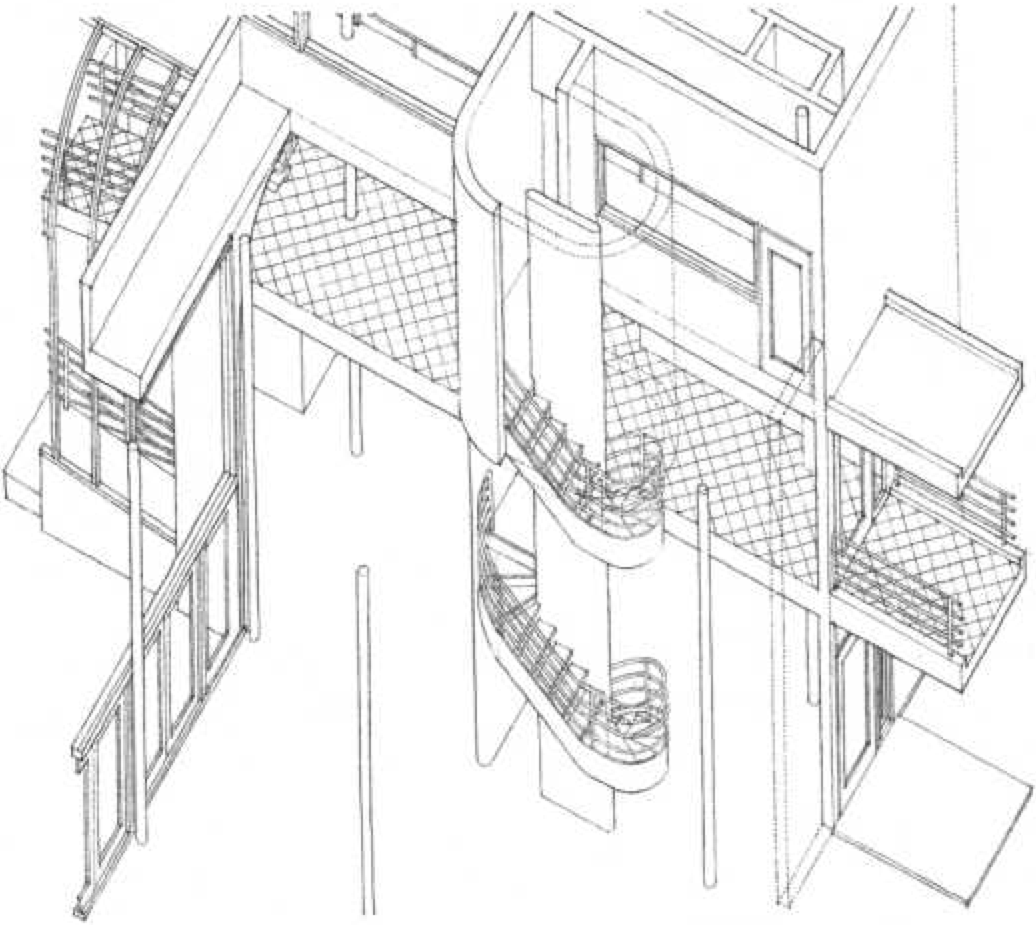
Stairs are three-dimensional forms just as moving up or down a stairway is a three-dimensional experience. This three-dimensional quality can be exploited when we treat it as sculpture, freestanding within a space or attached to a wall plane. Further, a space can itself become an oversized elaborated stairway.

楼梯是三度的形体，上下楼梯也是一种三度的体验。当把楼梯作为一件雕塑，独立于空间之中或附着于墙面上时，我们可以充分利用楼梯三度的特点。推而广之，空间本身也能成为一个超尺度的、精心设计的楼梯。



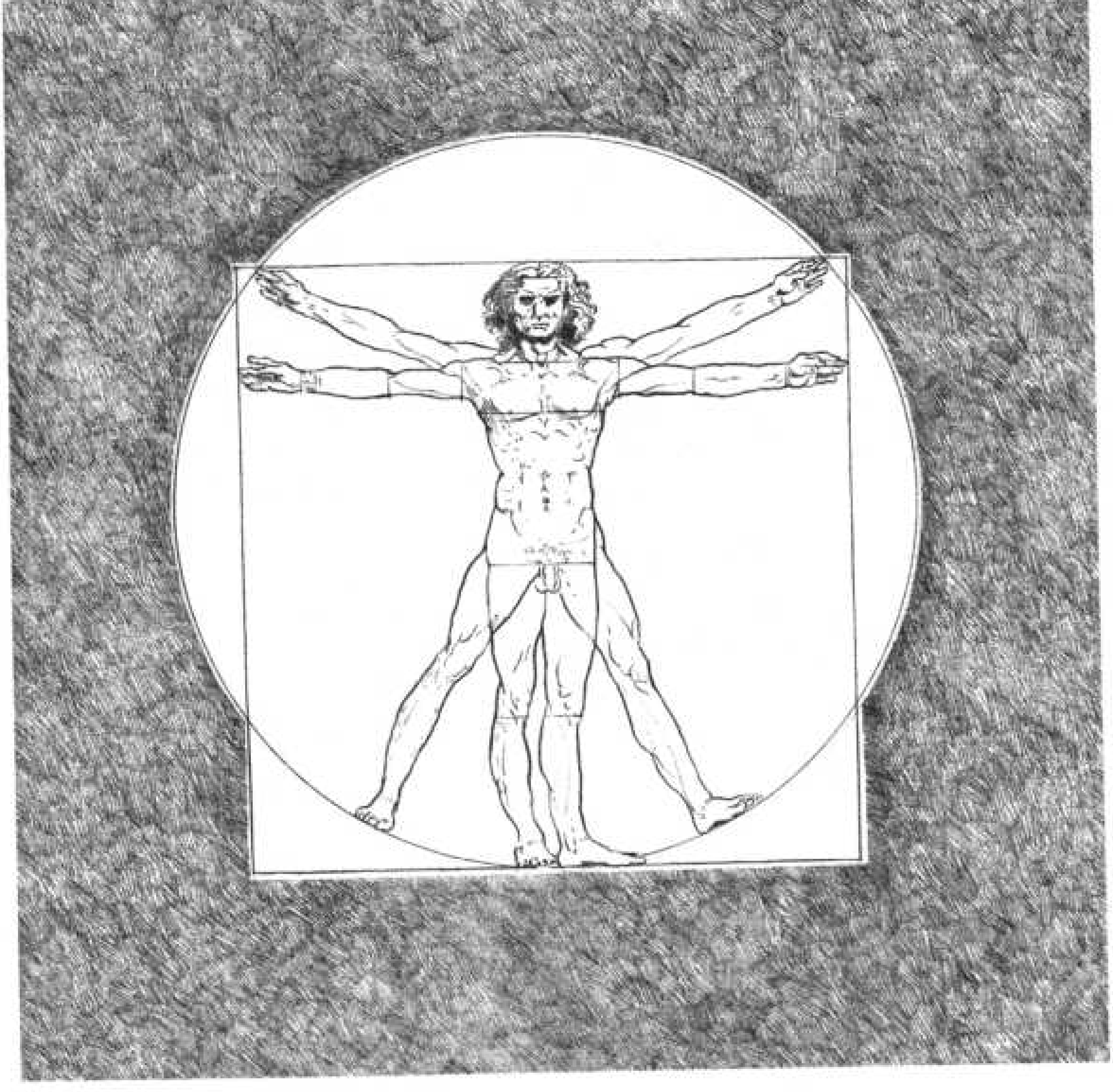
Grand Staircase, Paris Opera House, 1861–1874, Charles Garnier

大楼梯，巴黎歌剧院，1861年—1874年，C. 加尼埃尔



Axonometric of Living Room Stair, **House in Old Westbury**, New York, 1969–1971, Richard Meier

起居室楼梯的轴测图，**奥德韦斯特伯里的住宅**，纽约州，1969年—1971年，R. 迈耶



6 比例和尺度
Proportion & Scale

"... Within the Villa Foscari you are aware of the thickness of the walls that separate the rooms, each of which has been given definitive and precise form. At either end of the cross-arm of the central hall is a square room measuring 16 x 16 feet. It lies between a larger and a smaller rectangular room, the one 12 x 16, the other 16 x 24 feet, or twice as large. The smaller has its longer wall, the larger its shorter, in common with the square room. Palladio placed great emphasis on these simple ratios: 3:4, 4:4, and 4:6, which are those found in musical harmony. The width of the central hall is also based on 16. Its length is less exact because the thickness of the walls must be added to the simple dimensions of the rooms. The special effect of the hall in this firmly interlocked composition is produced by its great height, the barrel-vaulted ceiling towering high above the side rooms into the mezzanine. But, you may ask, does the visitor actually experience these proportions? The answer is yes—not the exact measurements but the fundamental idea behind them. You receive an impression of a noble, firmly integrated composition in which each room presents an ideal form within a greater whole. You also feel the the rooms are related in size. Nothing is trivial— all is great and whole."

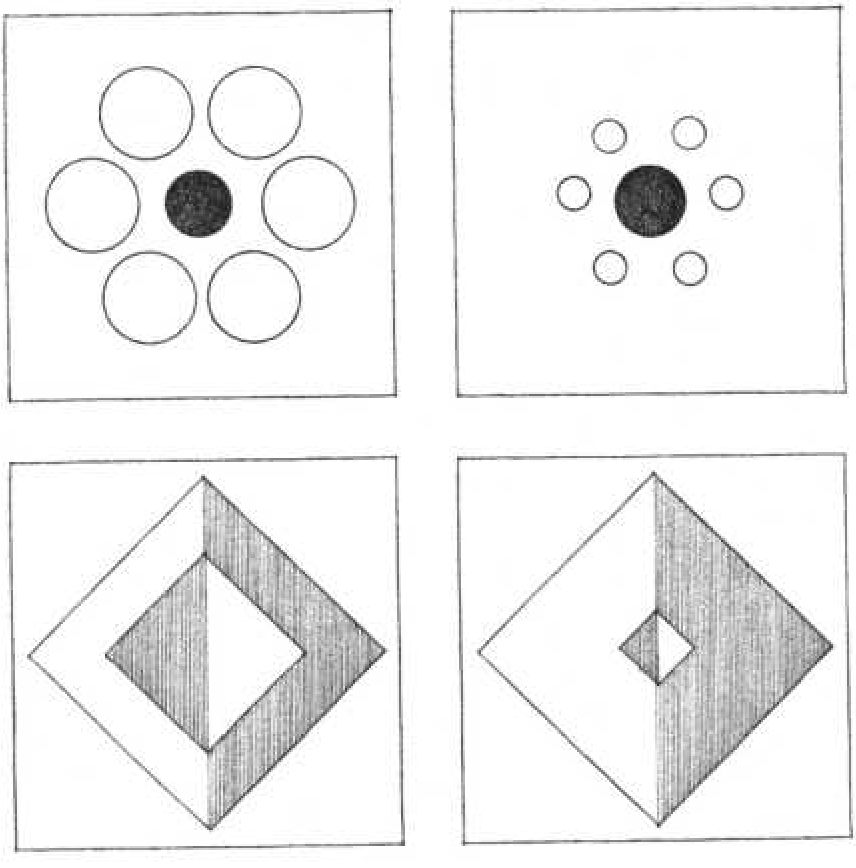
Steen Eiler Rasmussen
Experiencing Architecture
1962

"在弗斯卡里别墅中，你能意识到那些用来分隔房间的墙体厚度，每一道墙都被赋予了肯定而精确的形式。中心大厅十字交叉臂的尽端，都有一个方形房间，尺寸为16×16英尺。方形房间位于一大一小两个长方形房间之间，其中一个房间的尺寸为12×16英尺，另一个为16×24英尺，或者说是前一个房间面积的两倍。小房间的长边以及大房间的短边，与方形房间的边长相同。帕拉蒂奥特别强调这些简单的比例关系：3：4，4：4和4：6，这是在音乐和声中能够找到的比值。中心大厅的宽度也以16为基础。其长度不是那么精确，因为墙体厚度必须加入房间的量度之中。以这种严格的连锁构图形成的大厅，其特殊效果来自其非常的高度，桶拱屋顶高高在上，跨越侧房和夹层。但是，你也许会问，参观者真的能感受到这些比例关系吗？答案是肯定的——虽然感受到的不是精确的尺寸，但是能够感受到这些比例背后的基本思想。人们领悟到的是一种高贵的印象、非常完整的构图，其中每个房间都处于一个更大的整体中，呈现出一种理想的形式。人们还可以感觉到各个房间彼此关联。没有任何一点是无关紧要的——所有的一切都是重要而完整的。"

S. E. 拉斯姆森
《体验建筑》
1962年

This chapter discusses the interrelated issues of proportion and scale. While scale alludes to the size of something compared to a reference standard or to the size of something else, proportion refers to the proper or harmonious relation of one part to another or to the whole. This relationship may not only be one of magnitude, but also of quantity or degree. While the designer usually has a range of choices when determining the proportions of things, some are given to us by the nature of materials, by how building elements respond to forces, and by how things are made.

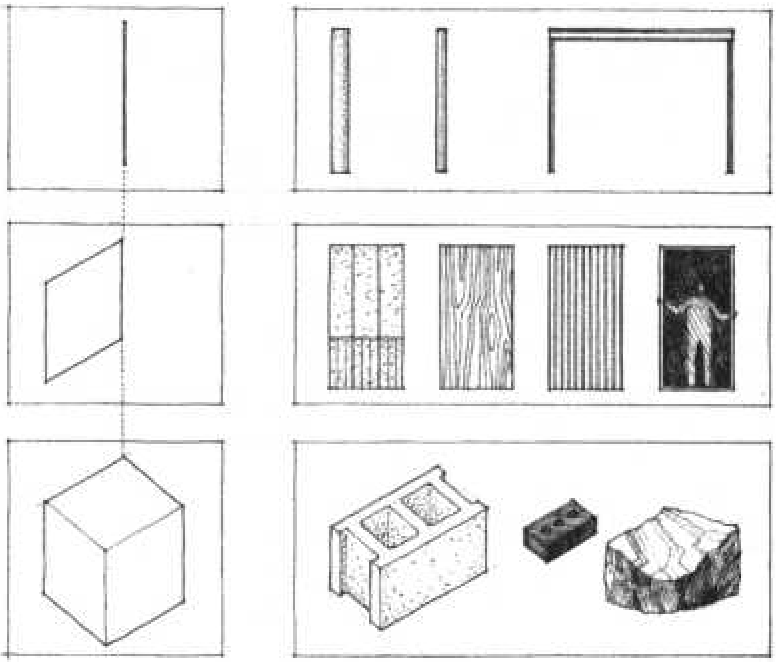
本章讨论比例和尺度相互关联的话题。尺度是指某物比照参考标准或其他物体大小时的尺寸；比例则是指一个部分与另外一个部分或整体之间的适宜或和谐的关系。这种关系可能不仅仅是重要性大小的关系，也是数量大小与级别高低的关系。在决定事物的比例时，设计者通常有一个选择范围，有些是通过材料的性质，通过建筑要素的应力方式以及事物的构成方式呈现给我们。



All building materials in architecture have distinct properties of elasticity, hardness, and durability. And they all have an ultimate strength beyond which they cannot extend themselves without fracturing, breaking, or collapsing. Since the stresses in a material resulting from the force of gravity increase with size, all materials also have rational dimensions beyond which they cannot go. For example, a stone slab that is four-inches thick and eight-feet long can be reasonably expected to support itself as a bridge between two supports. But if its size were to increase fourfold, to sixteen-inches thick and thirty-two-feet long, it would probably collapse under its own weight. Even a strong material like steel has lengths beyond which it cannot span without exceeding its ultimate strength.

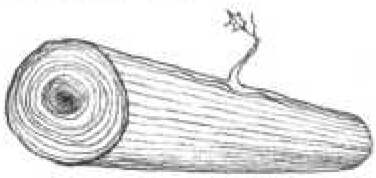


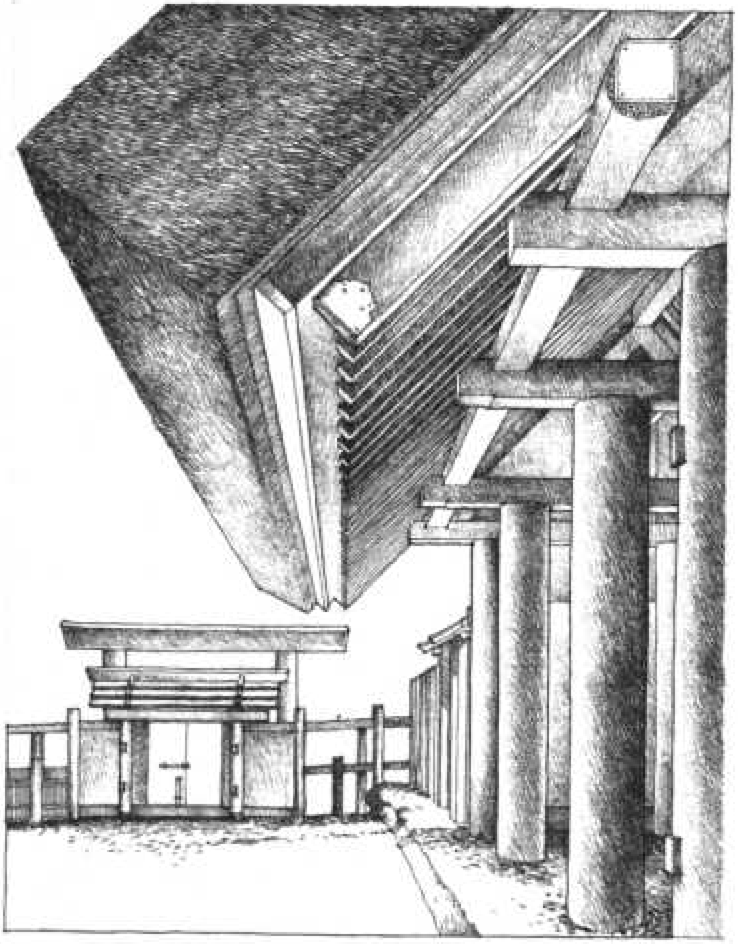
All materials also have rational proportions which are dictated by their inherent strengths and weaknesses. Masonry units like brick, for example, are strong in compression and depend on their mass for strength. Such materials are therefore volumetric in form. Materials like steel are strong in both compression and tension and can therefore be formed into linear columns and beams as well as planar sheet materials. Wood, being a flexible and fairly elastic material, can be used as linear posts and beams, planar boards, and as a volumetric element in log cabin construction.



所有的建筑材料都有弹性、硬度、耐久性等不同的属性。而且所有材料都有一个强度极限，如果超过这个极限，建筑材料本身就不能再伸长，只能断裂或坍塌。由于重力作用，材料内的应力会随着物体尺寸的增加而增大，因此所有的材料还要有合理的尺寸，超过了也不行。例如，一块4英寸厚、8英尺长的石板，可以合理地架在两个支点上，支撑自重并当作石桥。但是，如果将它的尺寸扩大4倍，长32英尺、厚16英寸，那么它很可能由于自重而坍塌。即使像钢材这样强度很大的材料也有长度限制，超过了这一限制，钢材也会因为超过强度极限而难以跨越。

同样，所有的材料也有一个合理的比例，这是由材料固有的强度和弱点所决定的。例如，像砖这样的砌体抗压强度大，而且依靠整体获得强度，因此这类材料的形式具有体量感。像钢材这类材料，抗压和抗拉都很强，因而可以塑造成线式的柱和梁以及平板。木材，作为一种灵活且相当富有弹性的材料，可以用作线式的立柱、横梁和平板，或者在小木屋结构中作为整体构件。





South gateway of the third fence of **Naigu, the inner shrine, Ise Shrine**, Mie Prefecture, Japan, A.D. 690

内殿第三道围墙的南门道，**内殿**，**伊势神社**，三重县，日本，690年

In the construction of architecture, structural elements are called upon to span spaces and transmit their loads through vertical supports to the foundation system of a building. The size and proportion of these elements are directly related to the structural tasks they perform and can therefore be visual indicators of the size and scale of the spaces they help enclose.

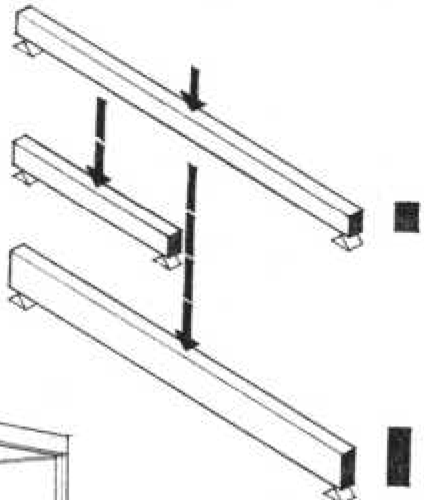
在建筑结构中，结构要素用来跨越空间，并通过竖向支撑将它们的荷载传递到建筑物的基础体系。这些构件的尺寸和比例与它们所承担的结构任务直接相关。因此，在围合而成的空间中这些构件是空间尺寸与尺度的视觉指示仪。

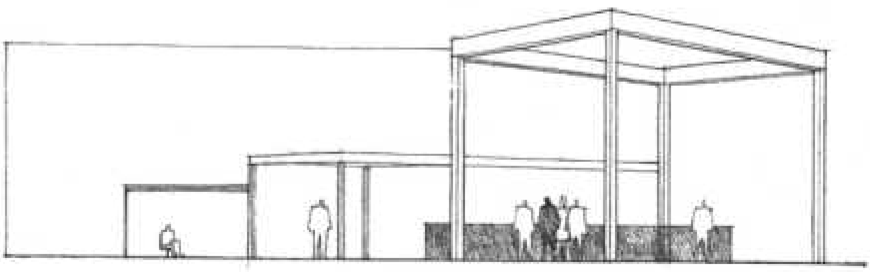
Beams, for example, transmit their loads horizontally across space to their vertical supports. If the span or load of a beam were doubled, its bending stresses would likewise double, possibly causing it to collapse. But if its depth were doubled, its strength would increase fourfold. Depth, therefore, is the critical dimension of a beam and its depth-to-span ratio can be a useful indicator of its structural role.

例如横梁，它的荷载是沿水平方向跨越空间传递到竖向支撑上。如果横梁的跨度或荷载增加一倍，它的弯应力也将增加一倍，横梁很可能会倒塌。但如果横梁的断面高度增加一倍，它的强度则增加到4倍。因此，断面高度是横梁的关键指标，其高跨比可以作为其结构作用的良好指标。

In a similar manner, columns become thicker as their loads and unsupported height increase. Together, beams and columns form a skeletal structural framework that defines modules of space. By their size and proportion, columns and beams articulate space and give it scale and a hierarchical structure. This can be seen in the way joists are supported by beams, which in turn are supported by girders. Each element increases in depth as its load and span increase in size.

同样，随着荷载和支点间高度的增加，柱子也要相应加粗。梁与柱一起形成一幅划分空间模度的结构框架。通过它们的尺寸和比例，柱与梁清楚地表现了空间，并为空间赋予了尺度和结构层次。这一切可以通过主梁支撑次梁、大梁支撑主梁的方式观察出来。当荷载和跨度增加时，各种构件的断面高度都要增加。



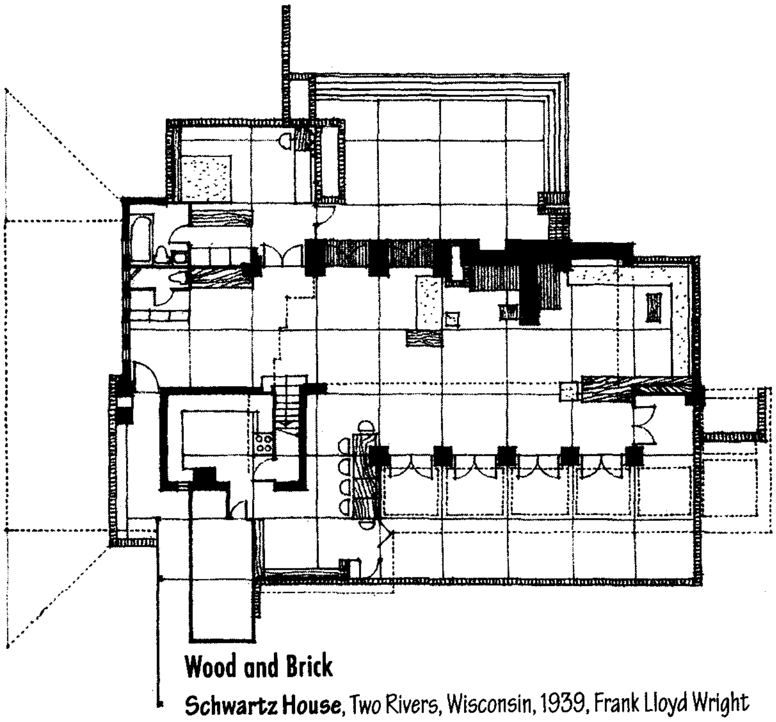


The proportions of other structural elements, as bearing walls, floor and roof slabs, vaults, and domes, also give us visual clues to their role in a structural system as well as the nature of their material. A masonry wall, being strong in compression but relatively weak in bending, will be thicker than a reinforced concrete wall doing the same work. A steel column will be thinner than a wood post supporting the same load. A four-inch-thick reinforced concrete slab will span farther than four-inch wood decking.

其他结构要素的比例，如承重墙、地板、屋面板、拱顶和穹顶的比例，也为我们了解这些构件在结构体系中的作用及其材料性质提供了视觉线索。由于抗压强度大而抗拉强度相对较弱，一堵砖砌墙在承担相同工作时，要比钢筋混凝土墙厚。在承担同样荷载时，钢柱要比木柱细。4英寸厚的钢筋混凝土板要比4英寸厚的木板跨度大得多。

As a structure depends less on the weight and stiffness of a material and more on its geometry for stability, as in the case of a membrane structure or a space frame, its elements will get thinner and thinner until they lose their ability to give a space scale and dimension.

由于结构的稳定性主要依靠它的几何形状而不是依靠材料的重量和刚度，因此像薄膜结构和空间网架之类的结构，其构件将会变得越来越细，直到它们失去表现空间尺度和量度的能力。

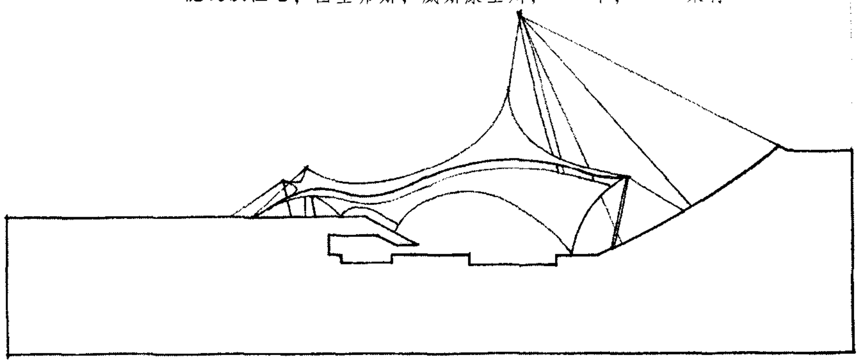


Wood and Brick

Schwartz House, Two Rivers, Wisconsin, 1939, Frank Lloyd Wright

砖木结构

施瓦茨住宅，图里弗斯，威斯康星州，1939年，F. L. 莱特

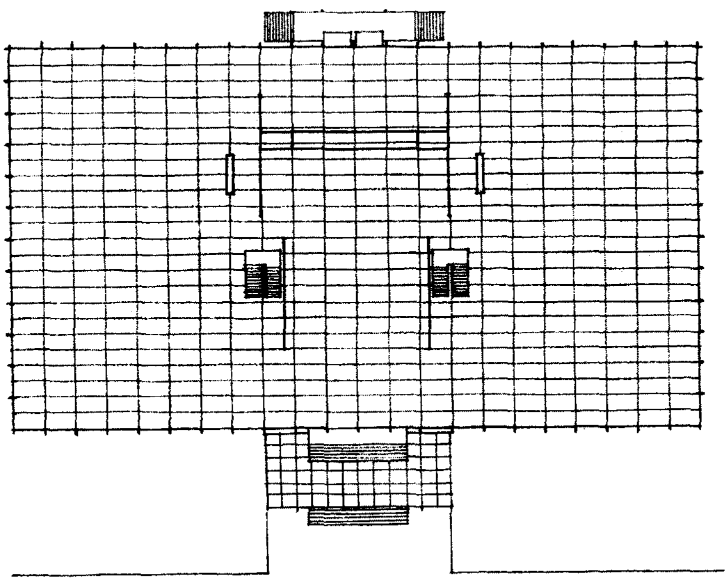


Membrane

Roof of **Olympic Swimming Arena**, Munich, Germany, 1972, Fred Otto

薄膜结构

奥林匹克游泳场屋顶，慕尼黑，德国，1972年，F. 奥托

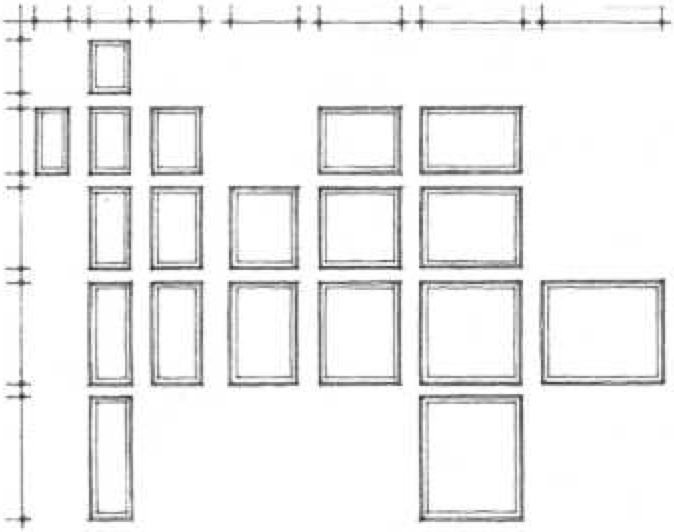


Steel

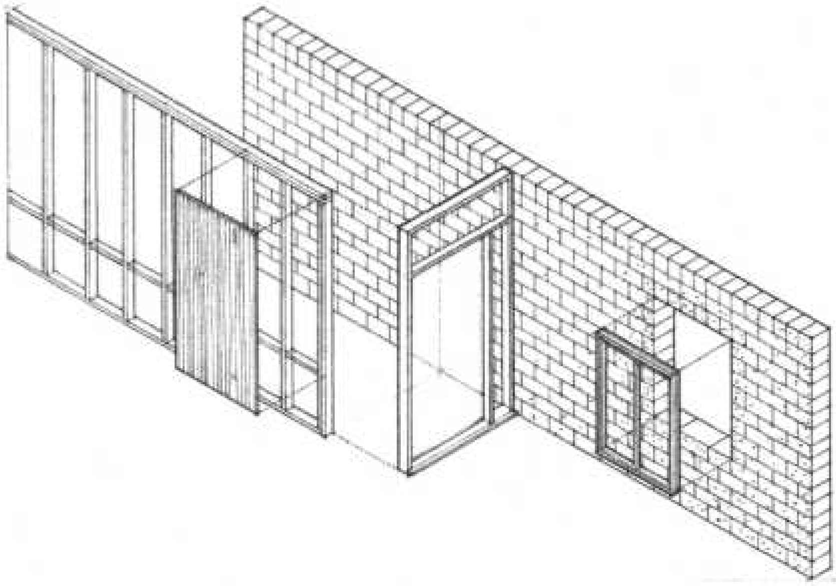
Crown Hall, Illinois Institute of Technology, Chicago, 1956, Mies van der Rohe

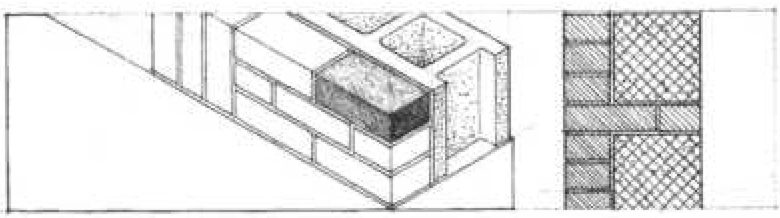
钢架结构

皇冠厅，伊利诺斯理工学院，芝加哥，1956年，密斯·凡德罗



Standard Casement Window Units
标准门窗单元





Many architectural elements are sized and proportioned not only according to their structural properties and function, but also by the process through which they are manufactured. Because these elements are mass-produced in factories, they have standard sizes and proportions imposed on them by the individual manufacturers or by industry standards.

许多建筑构件的尺寸和比例不仅受到结构特征和功能的影响，而且还受到生产过程的影响。由于构件都是在工厂里大批量生产的，因此它们是按照个体厂商或工业标准提出的要求，具有标准的尺寸和比例。

Concrete block and common brick, for example, are produced as modular building units. Although they differ from each other in size, both are proportioned on a similar basis. Plywood and other sheathing materials also are manufactured as modular units with fixed proportions. Steel sections have fixed proportions generally agreed upon by the steel manufacturers and the American Institute of Steel Construction. Windows and doors have proportions that are set by the individual manufacturers of the units.

例如混凝土预制板和普通的砖，就是作为建筑的模度单位而生产的。虽然它们的尺寸不一定相同，但都有着统一的比例基础。胶合板和其他面板料也都制作成固定比例的模度单位。型钢断面的比例由钢铁制造商和美国钢结构协会统一起来。但门窗单元的比例，仍由各生产厂商自己决定。

Since these and other materials must ultimately come together and achieve a high degree of fit in the construction of a building, the standard sizes and proportions of factory-produced elements affect the size, proportion, and spacing of other materials as well. Standard door and window units are sized and proportioned to fit into modular masonry openings. Wood or metal studs and joists are spaced to accept modular sheathing materials.

由于各种各样的材料最终还需汇集于一处，高度吻合地建造成一所房屋，所以工厂生产的建筑构件的标准尺寸、比例将会影响到其他材料的尺寸、比例和间距。标准的门窗单元，其尺寸和比例必须适合模度化砌体上的开洞。木质或金属的墙筋与格栅，其间距也必须与模度化的围护材料相符合。

Even considering the proportional constraints imposed on a form by the nature of its material, its structural function, or by the manufacturing process, the designer still has the ability to control the proportion of the forms and spaces within and around a building. The decision to make a room square or oblong in plan, intimate or lofty in scale, or to endow a building with an imposing, higher-than-normal facade, legitimately falls to the designer. But on what basis are these decisions made?

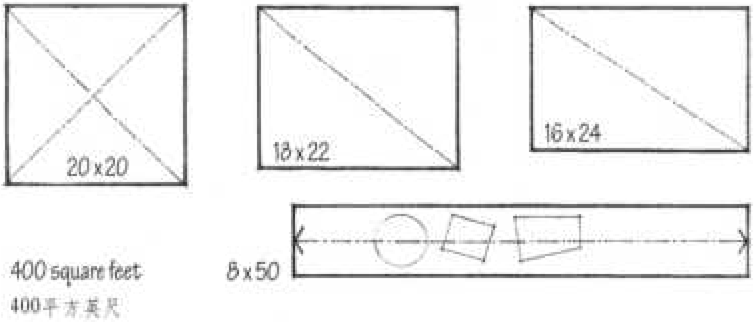
建筑材料的性质、结构功能以及生产过程都会制约建筑形式的比例。即使考虑到这些限制，设计者仍有能力控制建筑内外形体与空间的比例。房间的平面是正方形还是长方形，尺度亲切还是宏伟，或者给建筑物以雄伟壮丽、高于寻常的立面等，就理所当然由设计者来决定。但是这些决定的依据何在呢？

If a space 400 square feet in area were required, what dimensions—what ratios of width-to-length and length-to-height—should it have? Of course, the functioning of the space and the nature of the activities to be accommodated will influence its form and proportion.

如果一个空间需要400平方英尺的面积，那么它应该具有怎样的尺度呢？宽与长以及长与高的比率应该如何？当然，空间的功能以及空间中各种行为的特征将会影响其形式和比例。

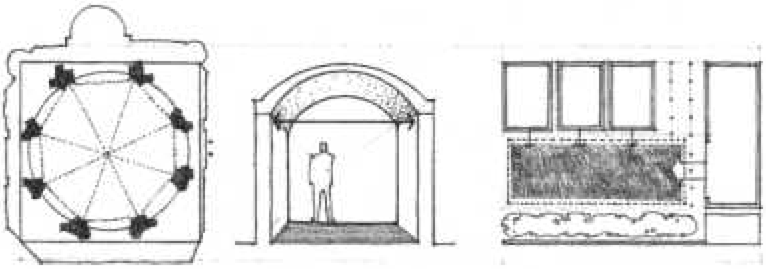
A technical factor, such as its structure, might limit one or more of its dimensions. Its context—the exterior environment or an adjacent interior space—might pressure its form. The decision might be to recall a space from another time and place and to simulate its proportions. Or the decision might be based finally on an aesthetic, visual judgment of the "desirable" relationships among the dimensions of the parts and the whole of a building.

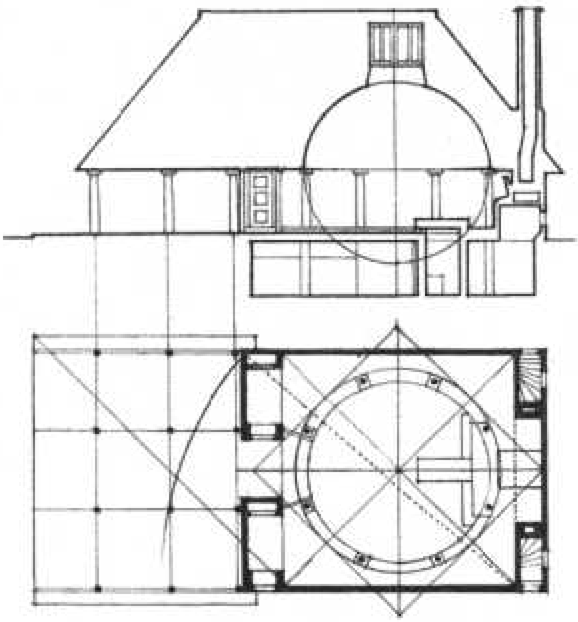
像结构这样的技术因素也会对空间造成一方面或多方面的影响。其环境，如外部环境或相邻的内部空间，也会限制建筑物的形体。最终决定可能是为了使人想起以前某个地方的一个空间而去模仿其比例。或者，最后是以审美判断为基础，以建筑物局部之间，局部与整体之间的"理想"尺度关系的视觉判断为基础，来做出裁决。



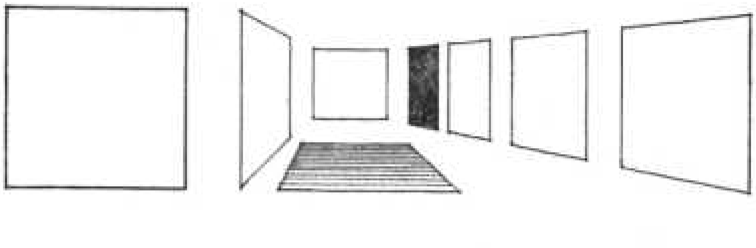
A square space, having four equal faces, is static in nature. If its length expands and dominates its width, it becomes more dynamic. While square and oblong spaces define places for activity, linear spaces encourage movement and are susceptible to subdivision into a number of zones.

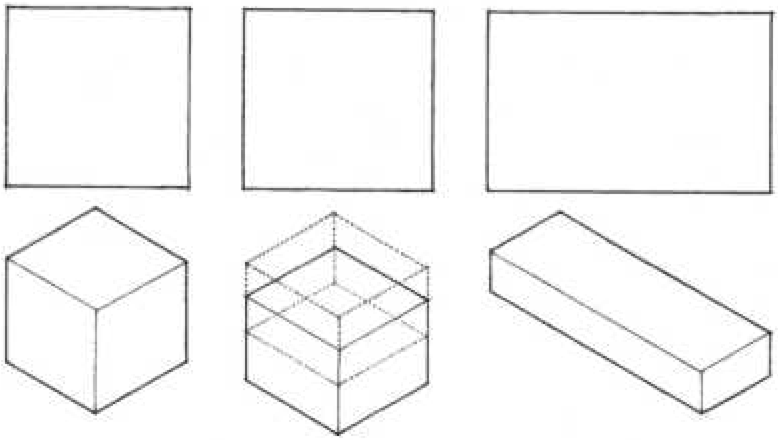
一个正方形的空间具有四个完全相同的面，所以性质稳定。如果其长度增加，并远远大于其宽度，它就变得更富于动态。正方形或长方形的空间限定活动的场所，而线式的空间则鼓励运动，并易于分成若干地段。





Woodland Chapel,
Stockholm, Sweden, 1918–1920, Erik Gunnar Asplund
林地礼拜堂，斯德哥尔摩，瑞典，1918年—1920年，E.G.阿斯伯兰德





In truth, our perception of the physical dimensions of architecture, of proportion and scale, is imprecise. It is distorted by the foreshortening of perspective and distance, and by cultural biases, and is thus difficult to control and predict in an objective and precise manner.

事实上，我们对于建筑各个实际量度的感知，对于比例和尺度的感知，都不是准确无误的。透视和距离的误差以及文化偏向都会使我们的感知失真，因此要用客观和精确的方式来控制和预测我们的感知决非易事。

Small or slight differences in the dimensions of a form are especially difficult to discern. While a square, by definition, has four equal sides and four right angles, a rectangle can appear to be exactly square, almost a square, or very much unlike a square. It can appear to be long, short, stubby, or squat, depending on our point of view. We use these terms to give a form or figure a visual quality that is largely a result of how we perceive its proportions. It is not, however, an exact science.

形体量度方面的细微差别特别难以察觉。根据定义，正方形具有四条长度相等的边和四个直角，一个矩形可以看起来与正方形完全一样，或者差不多，也可以相差甚远。它可以显得很长，或者很短，粗壮或者矮短，这完全决定于我们的视点。我们用这些词语来描述形式或图形的视觉特征，这一特征主要是我们感知其比例关系的结果。然而这并不是精确的科学。

Ratio: $\frac{a}{b}$

比：$\frac{a}{b}$

Proportion: $\frac{a}{b} = \frac{c}{d}$ or $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{d}{e}$

比例：$\frac{a}{b} = \frac{c}{d}$ 或 $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{d}{e}$

Proportion is the equality between two ratios in which the first of the four terms divided by the second equals the third divided by the fourth.

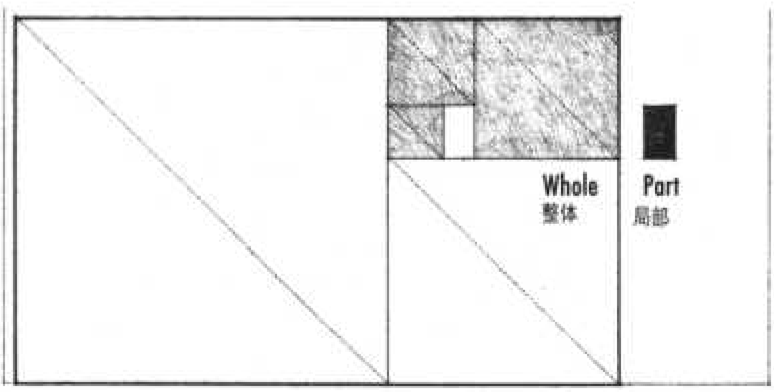
比例是两个比值之间的等式，其中四个量中的第一个除以第二个等于第三个除以第四个。

If the precise dimensions and relationships of a design that is regulated by a proportioning system cannot be objectively perceived in a similar manner by everyone, why are proportioning system useful and of particular significance in architectural design?

既然按照比例系统的规则所设计的精确尺寸和关系并不可能完全客观地使任何人都得到相同的感觉，那为什么在建筑设计中比例系统又神通广大，并具有举足轻重的意义呢？

The intent of all theories of proportions is to create a sense of order and harmony among the elements in a visual construction. According to Euclid, a ratio refers to the quantitative comparison of two similar things, while proportion refers to the equality of ratios. Underlying any proportioning system, therefore, is a characteristic ratio, a permanent quality that is transmitted from one ratio to another. Thus, a proportioning system establishes a consistent set of visual relationships between the parts of a building, as well as between the parts and the whole. Although these relationships may not be immediately perceived by the casual observer, the visual order they create can be sensed, accepted, or even recognized through a series of repetitive experiences. Over a period of time, we might begin to see the whole in the part, and the part in the whole.

一切关于比例的理论，人们都致力于在视觉结构的各要素中建立秩序感与和谐感。根据欧几里得的说法，比值是指两个相似事物的数量比，而比例则是指比值的相等关系。因此，任何比例系统中都包含着一个有特征的比值，这是一个永恒的特征，从一个比值传到另一个比值。这样，一个比例系统就在建筑物的局部之间以及局部与整体之间，建立起一套具有连贯性的视觉关系。虽然这些关系未必能被一个漫不经心的观察者一眼看出，但是，通过一系列的反复体验，这些关系所产生的视觉秩序是可以被感知、接受，甚至得到公认。经过一段时间，我们也许能够达到寓整体于局部，或者寓局部于整体的境界。



Proportioning systems go beyond the functional and technical determinants of architectural form and space to provide an aesthetic rationale for their dimensions. They can visually unify the multiplicity of elements in an architectural design by having all of its parts belong to the same family of proportions. They can provide a sense of order in, and heighten the continuity of, a sequence of spaces. They can establish relationships between the exterior and interior elements of a building.

在建筑形式与空间处理方面，比例系统已经不仅仅是功能与技术的决定因素，而是为其提供了一套美学理论。通过将建筑物的各个局部归属于统一比例谱系的办法，比例系统可以使建筑设计中的众多要素具有视觉的统一性。比例系统能够使空间序列具有秩序感，加强其连续性，还能在建筑物室内和室外的各种要素中建立关系。

A number of theories of "desirable" proportions have been developed in the course of history. The notion of devising a system for design and communicating its means is common to all periods. Although the actual system varies from time to time, the principles involved and their value to the designer remain the same.

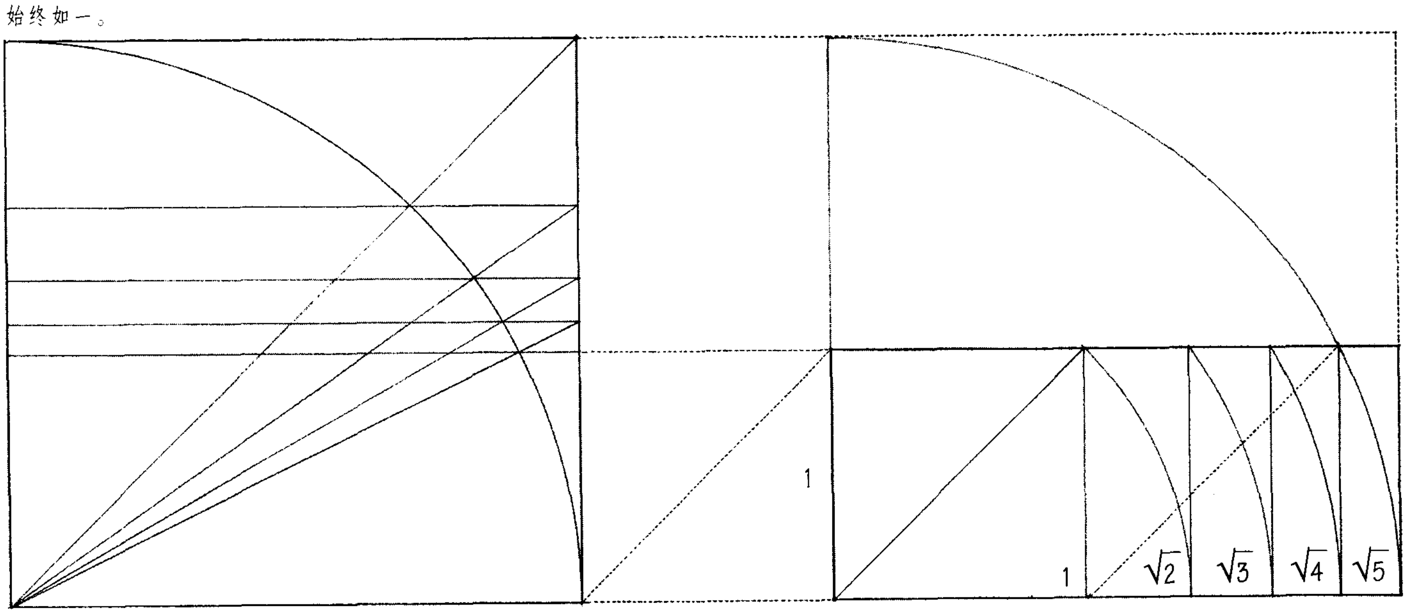
历史进程中，已经逐渐形成许多关于"理想"比例关系的理论。在各个历史时期，为设计制定一个比例系统，并传授其方法，是人们共同的意愿。虽然，在不同历史时期采取的比例系统各不相同，但是它的基本原则以及对设计者的价值却始终如一。

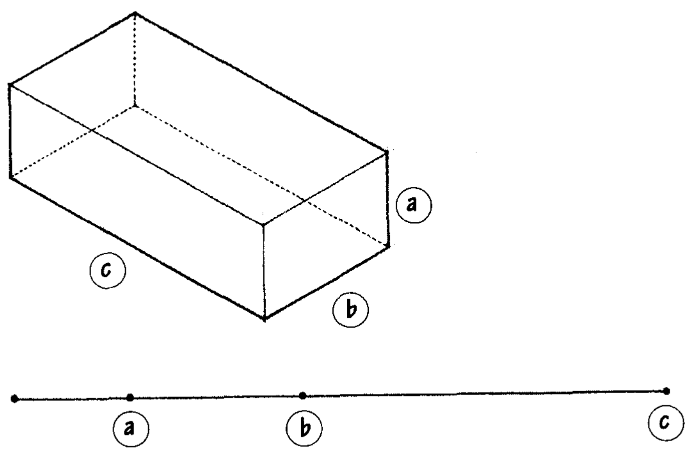
Theories of Proportion: 比例的理论：

- **Golden Section** 黄金分割
- **Classical Orders** 古典柱式
- **Renaissance Theories** 文艺复兴理论
- **Modulor** 模度
- **Ken** 间
- **Anthropometry** 人体比例
- **Scale** 尺度

A fixed proportion used in determining measurements and dimensions

用于决定尺寸和量度的固定比例





Types of Proportion:

比例的类别：

Arithmetic $\frac{c-b}{b-a} = \frac{c}{c}$ **(e.g., 1, 2, 3)**

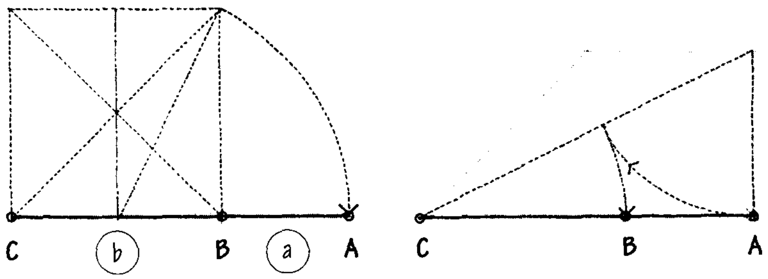
• 算数比 $\frac{c-b}{b-a} = \frac{c}{c}$ （例1，2，3）

Geometric $\frac{c-b}{b-a} = \frac{c}{b}$ **(e.g., 1, 2, 4)**

• 几何比 $\frac{c-b}{b-a} = \frac{c}{b}$ （例1，2，4）

Harmonic $\frac{c-b}{b-a} = \frac{c}{a}$ **(e.g., 2, 3, 6)**

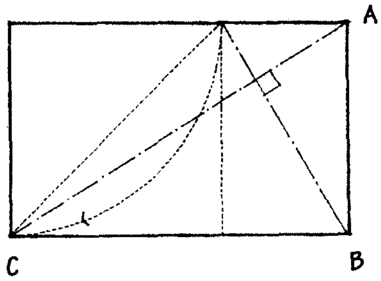
• 和谐比 $\frac{c-b}{b-a} = \frac{c}{a}$ （例2，3，6）



The geometric construction of the Golden Section, first by extension, and then by division.
黄金分割的几何结构是先延长，再分割。

Mathematical systems of proportion originate from the Pythagorean concept of 'all is number' and the belief that certain numerical relationships manifest the harmonic structure of the universe. One of these relationships that has been in use ever since the days of antiquity is the proportion known as the Golden Section. The Greeks recognized the dominating role the Golden Section played in the proportions of the human body. Believing that both humanity and the shrines housing their deities should belong to a higher universal order, they utilized these same proportions in their temple structures. Renaissance architects also explored the Golden Section in their work. In more recent times, Le Corbusier based his Modulor system on the Golden Section. Its use in architecture endures even today.

比例的数学系统来源于毕达哥拉斯的观念，“世界上的一切都是数字”，以及这样一种信条，即某些数字关系表明了宇宙的和谐结构。被称为“黄金分割”的比例关系便是自古以来所运用的数字关系之一。古希腊人发现，在人体比例中黄金分割起着决定性的作用。他们认为，不管是人类或是供奉神灵的圣殿都应该属于一种比较高级的宇宙秩序，因而，他们在庙宇建筑中运用了这些相同的比例。文艺复兴时期的建筑师也在他们的作品中探索了黄金分割。在近代，勒·柯布西埃的模度体系就是以黄金分割为基础而建立的。黄金分割在建筑中的应用甚至一直延续至今。



AB = a

BC = b

Ø = Golden Section

ϕ=黄金分割

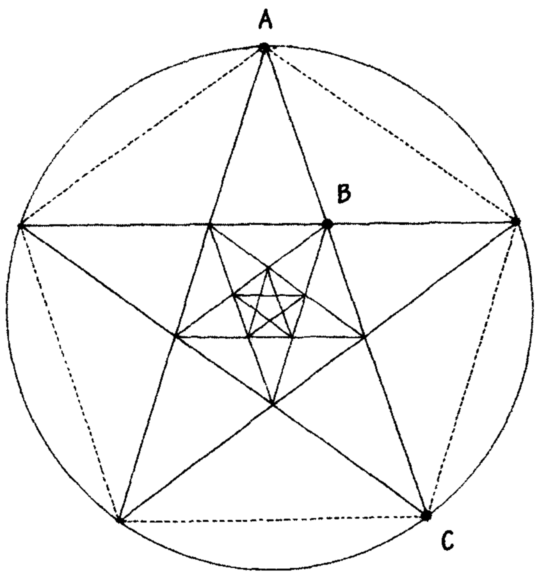
$$Ø = \frac{a}{b} = \frac{b}{a+b} = 0.618$$

The Golden Section can be defined as the ratio between two sections of a line, or the two dimensions of a plane figure, in which the lesser of the two is to the greater as the greater is to the sum of both. It can be expressed algebraically by the equation of two ratios:

$$\frac{a}{b} = \frac{b}{a+b}$$

黄金分割可以定义为：一条线被分为两段，两段的比值或者一个平面图形的两种尺寸之比，其中短段与长段的比值等于长段与二者之和的比值。它可以用代数式表达为两个比值的等式：

$$\frac{a}{b} = \frac{b}{a+b}$$



The Golden Section has some remarkable algebraic and geometric properties that account for its existence in architecture as well as in the structures of many living organisms. Any progression based on the Golden Section is at once additive and geometrical.

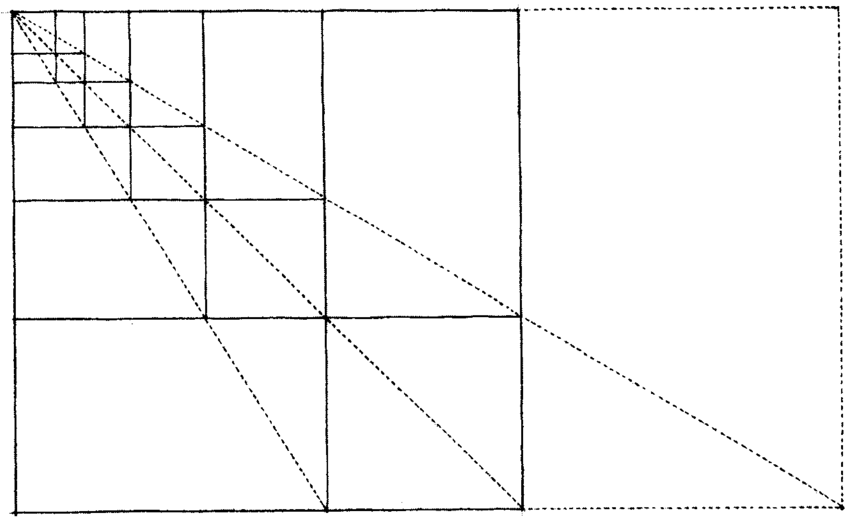
黄金分割具有一些奇妙的代数和几何的特性，这是它得以存在于建筑之中，而且还存在于许多生命机体结构之中的原因。任何以黄金分割为基础的连续数列都立刻变成累加的系列且富于几何特征。

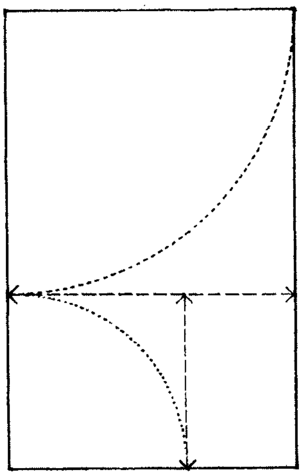
Another progression that closely approximates the Golden Section in whole numbers is the Fibonacci Series: 1, 1, 2, 3, 5, 8, 13 . . . . Each term again is the sum of the two preceding ones, and the ratio between two consecutive terms tends to approximate the Golden Section as the series progresses to infinity.
In the numerical progression: 1, $Ø^1$, $Ø^2$, $Ø^3$ . . . $Ø^n$, each term is the sum of the two preceding ones.

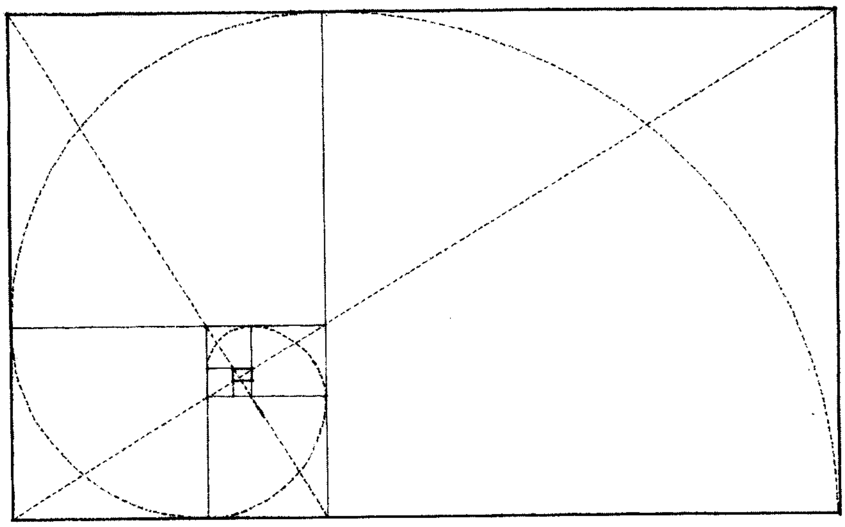
另外一个与黄金分割非常近似的整数数列是斐波纳契数列：1，1，2，3，5，8，13……其中每项都是前两项之和，并且当数列延续下去以至无穷的时候，相邻两项的比值也趋近于黄金比。在数列1，ϕ^1，ϕ^2，ϕ^3…ϕ^n中，每一项都是前两项之和。

A rectangle whose sides are proportioned according to the Golden Section is known as a Golden Rectangle. If a square is constructed on its smaller side, the remaining portion of the original rectangle would be a smaller but similar Golden Rectangle. This operation can be repeated indefinitely to create a gradation of squares and Golden Rectangles. During this transformation, each part remains similar to all of the other parts, as well as to the whole. The diagrams on this page illustrate this additive and geometrical growth pattern of progressions based on the Golden Section.

边长比为黄金分割比的矩形，称为“黄金矩形”。如果在矩形内以短边为边做正方形，原矩形中余下的部分将又是一个小的相似的黄金矩形。无限地重复这种作法，可以得到一个正方形和矩形的等级序列。在这种变化过程中，每个局部不仅与整体相似，而且与所有其余部分相似。本页上的图说明了以黄金分割为基础的数列所具有的递增和几何增长的模式。







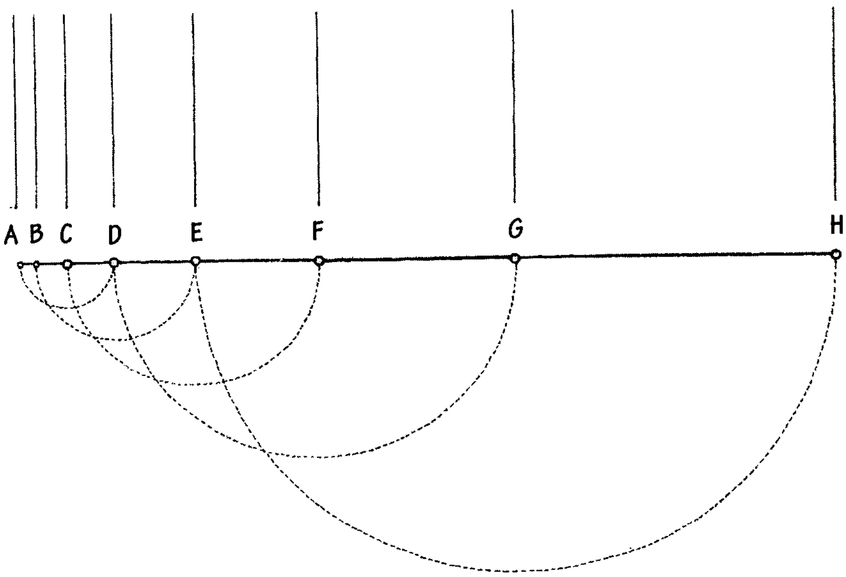
$$\frac{AB}{BC} = \frac{BC}{CD} = \frac{CD}{DE} \ldots\ldots = \emptyset$$

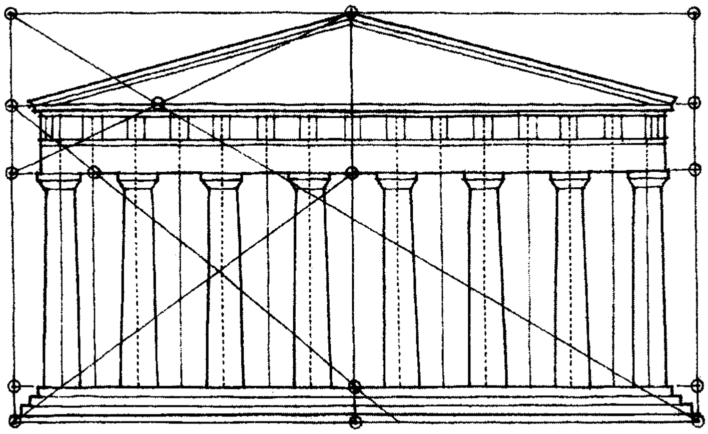
$AB + BC = CD$

$BC + CD = DE$

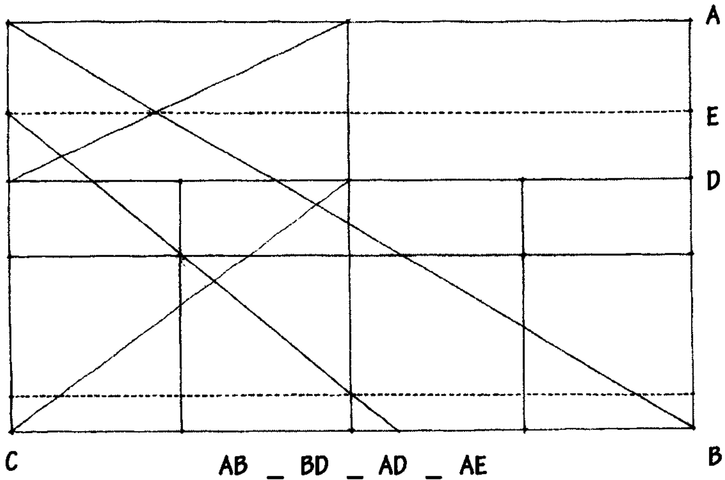
⋮

etc.





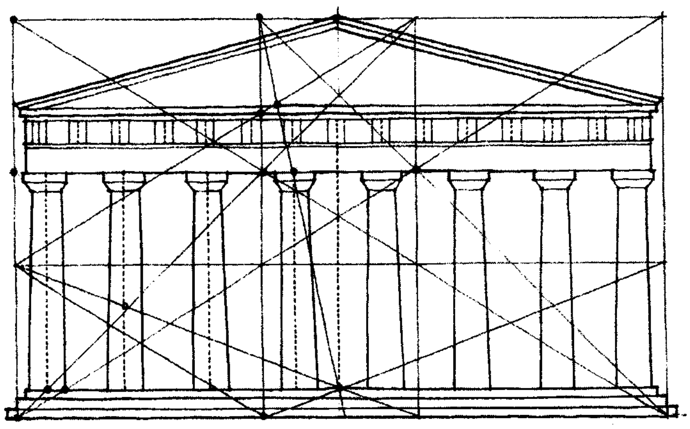
The Parthenon, Athens, 447–432 B.C., Ictinus and Callicrates
帕提侬，雅典，公元前447年—公元前432年，伊克蒂诺与卡里克莱特

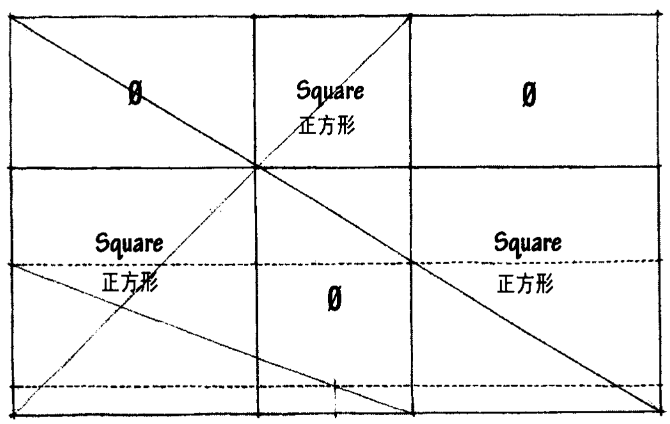


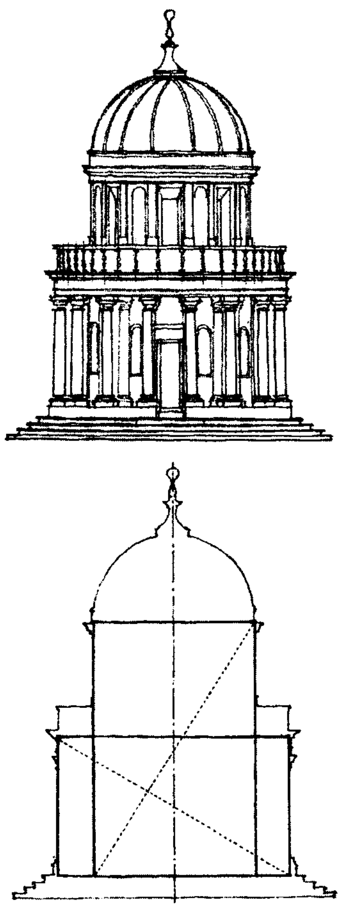
$$\frac{AB}{BC} = \frac{BD}{AB} = \frac{AD}{BD} = \frac{AE}{AD}$$

These two graphic analyses illustrate the use of the Golden Section in the proportioning of the facade of the Parthenon. It is interesting to note that while both analyses begin by fitting the facade into a Golden Rectangle, each analysis then varies from the other in its approach to proving the existence of the Golden Section and its effect on the dimensions and distribution of elements across the facade.

这两幅分析图说明：帕提侬神庙的正立面在划分比例时运用了黄金分割。值得注意的是，虽然两个分析图开始的时候都是把该立面放入一个黄金矩形中，但每张分析图证明黄金分割存在的方法却彼此不同，因而对正立面的尺寸及各构件的分布等分析效果也不同，这是很有趣的。

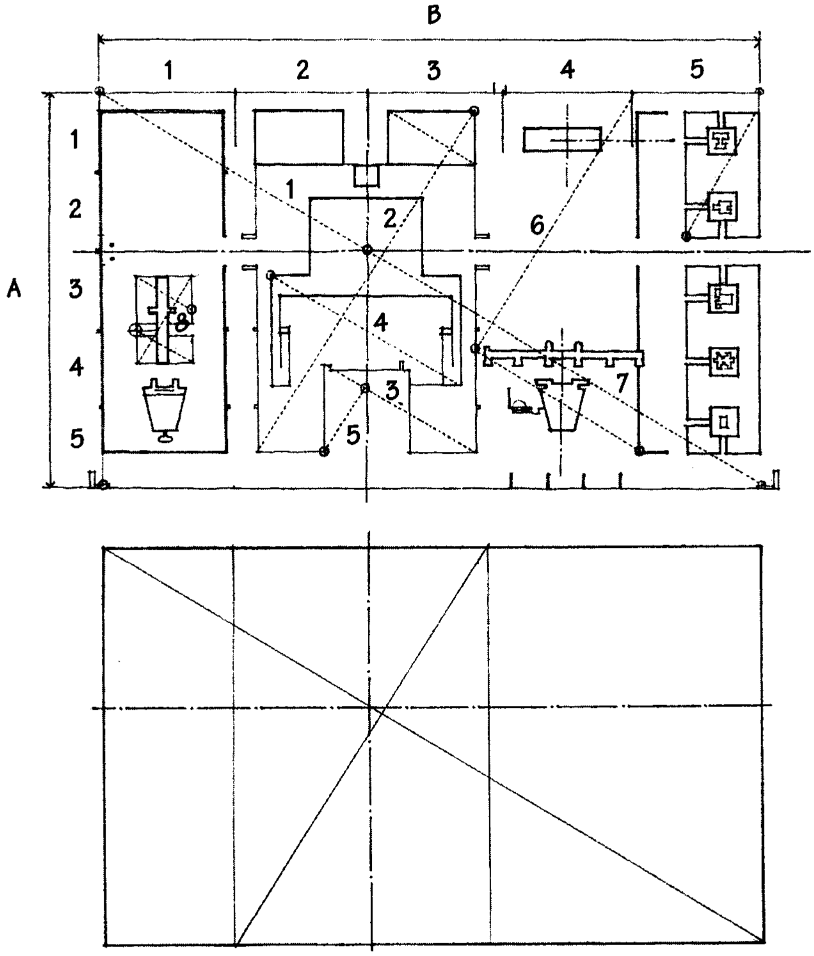






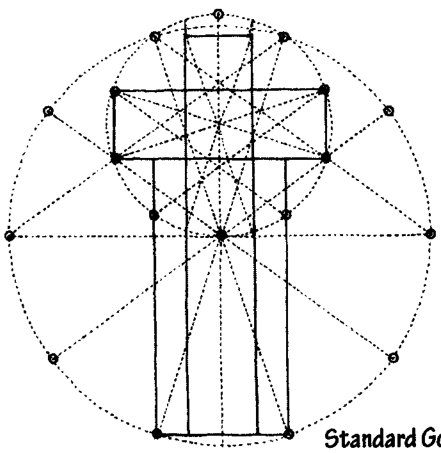
Tempietto of S. Pietro in Montorio, Rome, 1502–1510, Donato Bramante

蒙托里奥的**圣彼得教堂中的坦比埃多**，罗马，1502年—1510年， D. 伯拉孟特



World Museum (Project), Geneva, 1929, Le Corbusier

世界博物馆（方案），日内瓦，1929年， 勒·柯布西埃

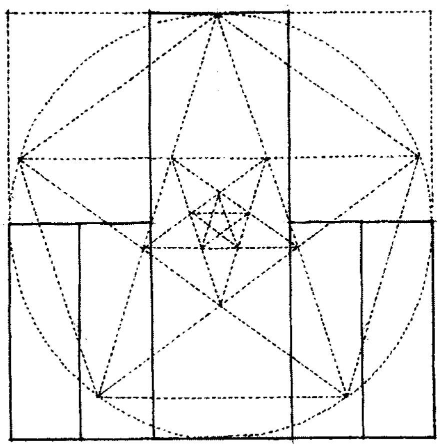


After Moessel

根据蒙塞尔

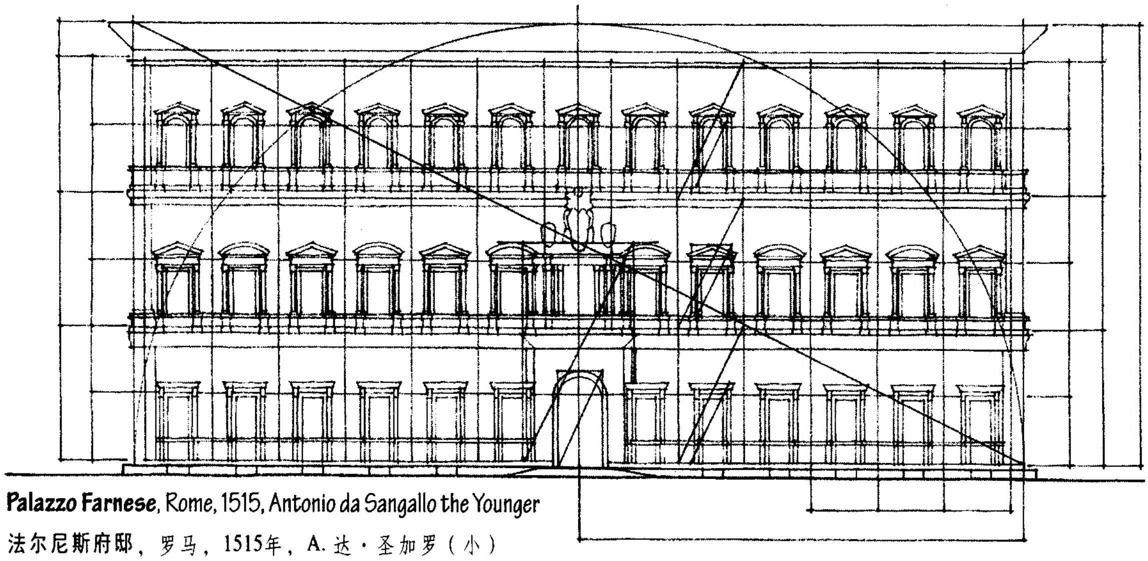
Standard Gothic Plan and Section

标准的哥特式建筑平面和剖面

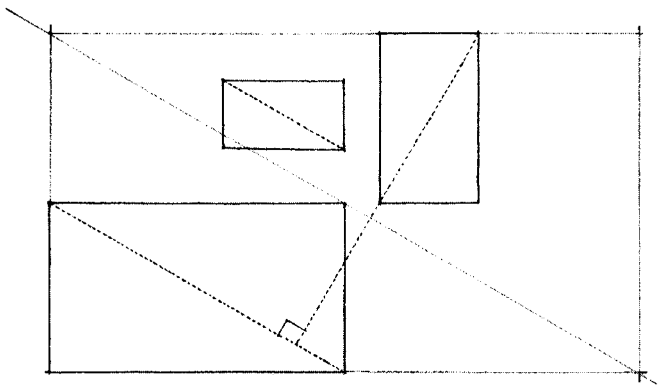


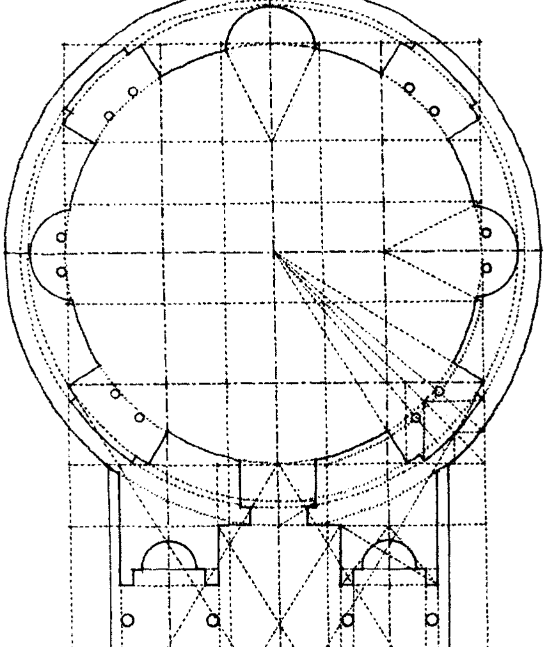
After F.M. Lund

根据F. M. 朗德



Palazzo Farnese, Rome, 1515, Antonio da Sangallo the Younger
法尔尼斯府邸，罗马，1515年，A. 达·圣加罗（小）





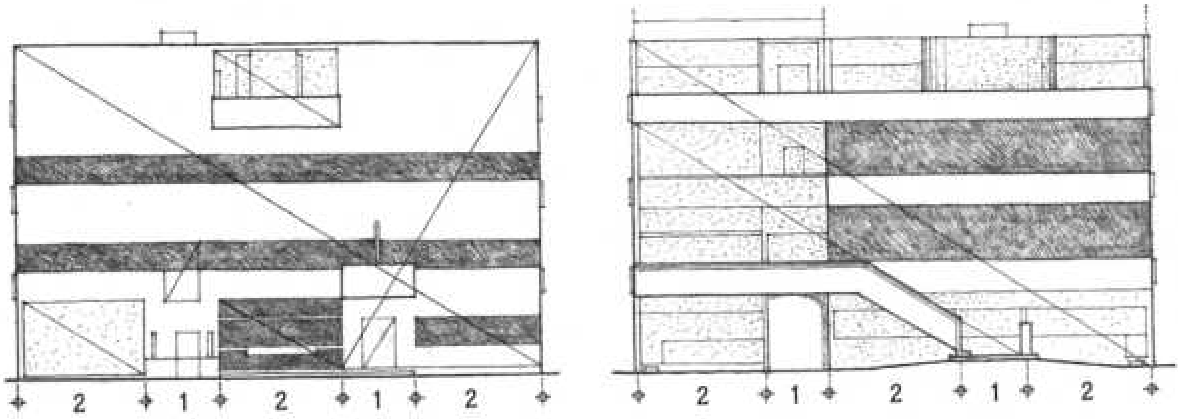
The Pantheon, Rome, A.D. 120–124
万神庙，罗马，120年—124年

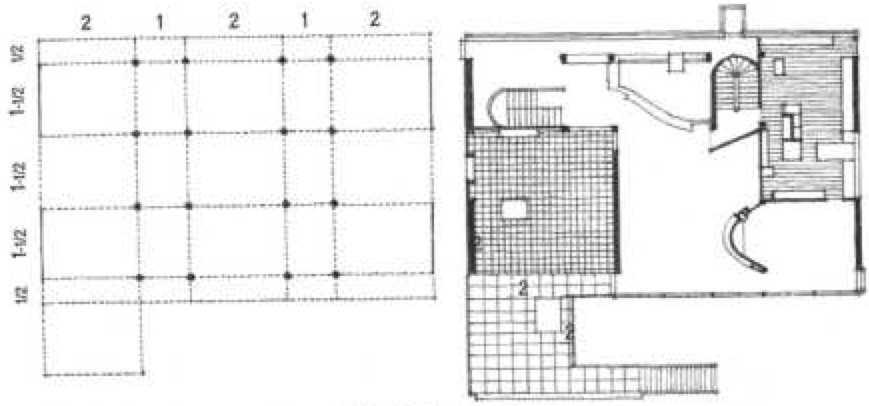
If the diagonals of two rectangles are either parallel or perpendicular to each other, they indicate that the two rectangles have similar proportions. These diagonals, as well as lines that indicate the common alignment of elements, are called regulating lines. They were seen previously in the discussion of the Golden Section, but they can also be used to control the proportion and placement of elements in other proportioning systems as well. Le Corbusier, in *Towards a New Architecture*, stated the following:

如果两个矩形的对角线互相平行或垂直，那么表明两个矩形的比例是相同的。这些对角线以及表示各要素共有关系的线，都称为"控制线"。在前面有关黄金分割的讨论中，我们已经见过这种控制线，但是这些线也可以用于其他比例系统来控制各要素的比例和位置。勒·柯布西埃在《走向新建筑》中讲了下面一段话：

"A regulating line is an assurance against capriciousness; it is a means of verification which can ratify all work created in fervour . . . It confers on the work the quality of rhythm. The regulating line brings in this tangible form of mathematics which gives the reassuring perception of order. The choice of a regulating line fixes the fundamental geometry of the work . . . It is a means to an end; it is not a recipe."

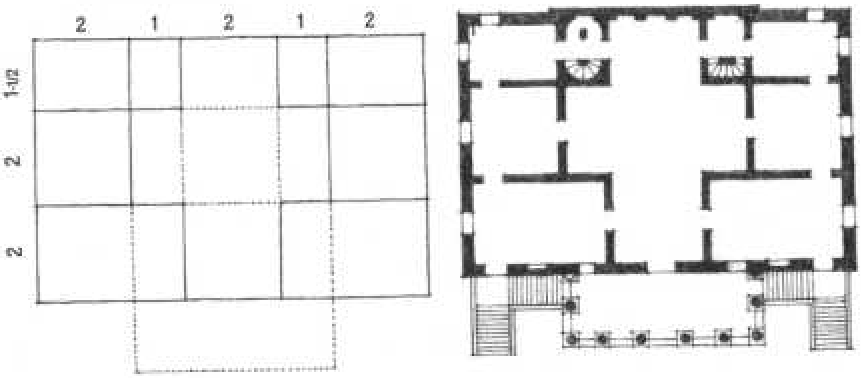
"一条控制线是反对任何主观任意性的保证；它是一种验证的方法，可以矫正在激情中做出的工作……它赋予一个作品以韵律感。控制线给这一具象的形式带来了数学，而数学则给这种形式以可靠的秩序感。一条控制线的选择规定了一件作品的基本几何特征……它是为了达到一定目的的手段；但它不是一个现成的药方。"





Villa Garches, *Vaucresson, France, 1926–1927, Le Corbusier*

加歇别墅，沃克里森，法国，1926年—1927年，勒·柯布西埃

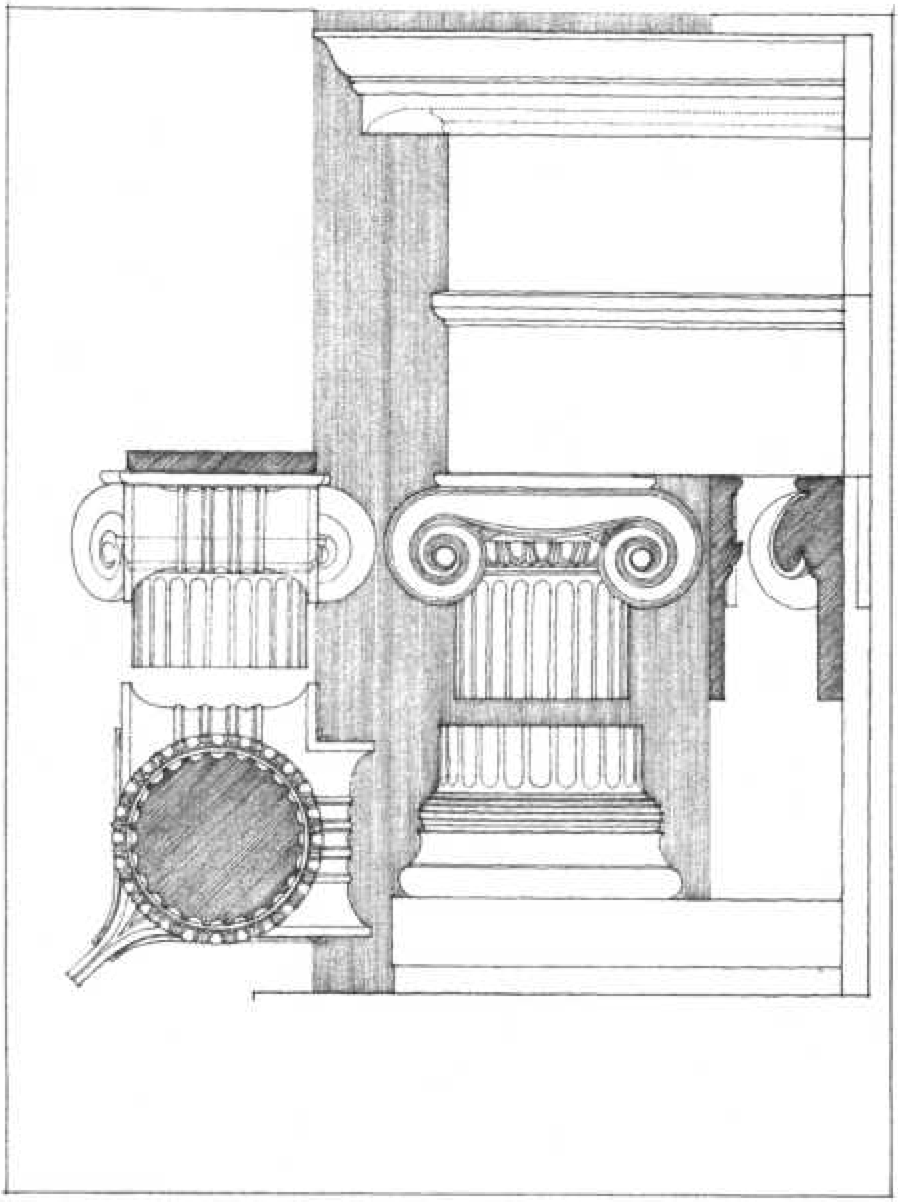


Villa Foscari, Malcontenta, Italy, 1558, Andrea Palladio

弗斯卡里别墅，梅尔肯塔，意大利，1558年，A. 帕拉蒂奥

In his essay, *The Mathematics of the Ideal Villa*, 1947, Colin Rowe pointed out the similarity between the spatial subdivision of a Palladian villa and the structural grid of a villa by Le Corbusier. While both villas shared a similar proportioning system and a relationship to a higher mathematical order, Palladio's villa consisted of spaces with fixed shapes and harmonic interrelationships. Le Corbusier's villa was composed of horizontal layers of free space defined by the floor and roof slabs. The rooms varied in shape and were asymmetrically arranged at each level.

1947年，科林·罗在他的《理想别墅中的数学》一文中，指出了帕拉蒂奥式别墅的空间划分与勒·柯布西埃的一个别墅在结构网格上的共同点。虽然这两个别墅都采用了相同的比例系统，并反映出很高的数学秩序关系，但是帕拉蒂奥的别墅中的空间形状固定，关系和谐。而柯布西埃的别墅则由横向分层的自由空间构成，这些自由空间是用楼板和顶棚划分的。房间的形状不一，非对称地布置在每层楼上。



Ionic Order, from the **Temple on the Ilissus**, Athens, 449 B.C., Callicrates. After a drawing by William R. Ware.

爱奥尼克柱式，出自**伊利索斯神庙**，雅典，公元前449年，卡里克莱特，根据W. R. 维尔的图复制

To the Greeks and Romans of classical antiquity, the Orders represented in their proportioning of elements the perfect expression of beauty and harmony. The basic unit of dimension was the diameter of the column. From this module were derived the dimensions of the shaft, the capital, as well as the pedestal below and the entablature above, down to the smallest detail. Intercolumniation — the system of spacing between columns—was also based on the diameter of the column.

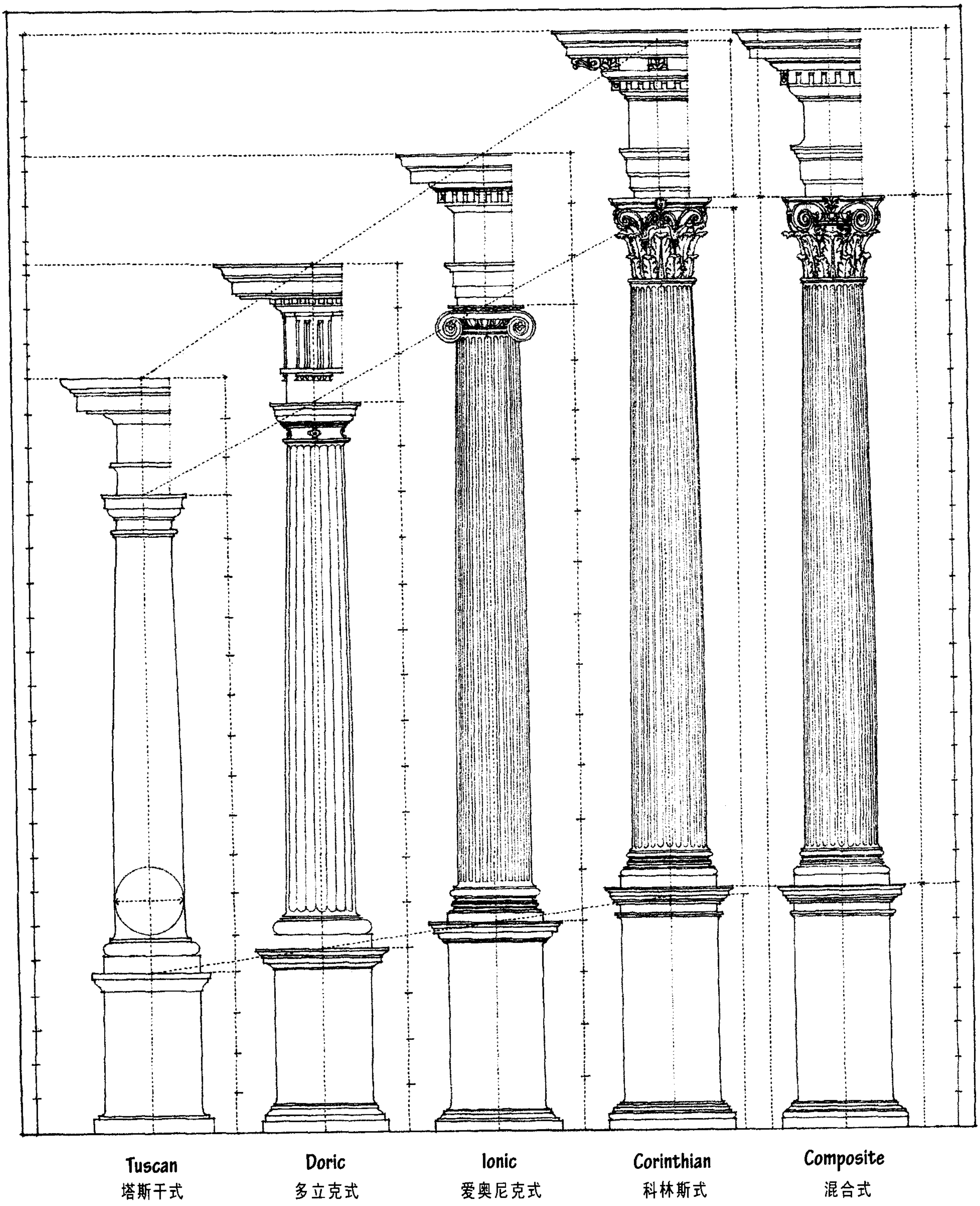
对于古希腊或古罗马的古迹而言，柱式以其各部分的比例尽善尽美地体现了优美与和谐。柱径是基本的量度单位，柱身、柱头以及下面的柱础和上面的柱檐直到最小的细部，都出自于这个模度。柱间距，即柱与柱之间的距离系统，也同样以柱径为基础。

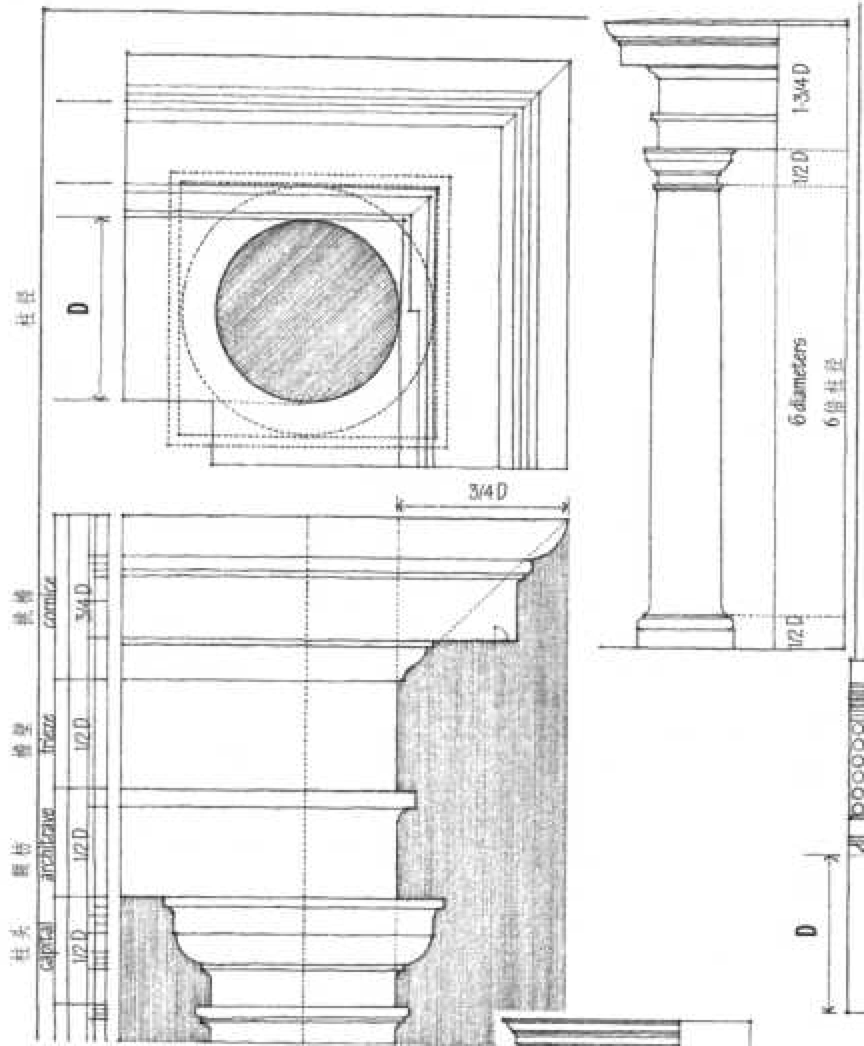
Because the sizes of columns varied according to the extent of a building, the Orders were not based on a fixed unit of measurement. Rather, the intention was to ensure that all of the parts of any one building were proportionate and in harmony with one another.

由于建筑物的大小不同，柱子的尺寸也不一样，因此柱式并不以一个固定的计量单位作基础。确切地说，这样做的目的是为了保证任何一栋建筑物所有的局部都成比例，并且互相协调。

Vitruvius, in the time of Augustus, studied actual examples of the Orders and presented his 'ideal' proportions for each in his treatise, *The Ten Books on Architecture*. Vignola recodified these rules for the Italian Renaissance and his forms for the Orders are probably the best known today.

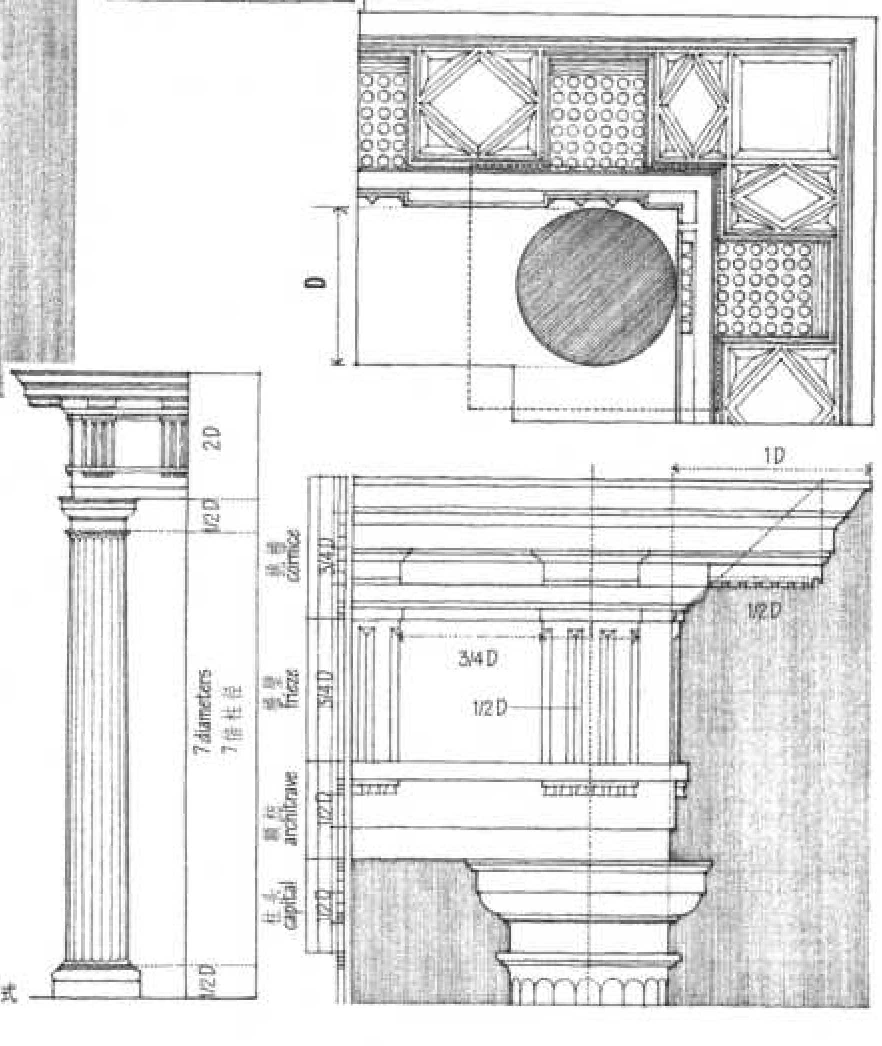
在奥古斯都大帝时期，维特鲁威研究了柱式的典型实例，并在他的论述《建筑十书》中阐述了各种"理想"的比例关系。维尼奥拉为意大利文艺复兴时期的建筑重新整理了这些法则，时至今日，他的柱式造型也许仍是最负盛名的。


Tuscan
塔斯干式
Doric
多立克式
Ionic
爱奥尼克式
Corinthian
科林斯式
Composite
混合式



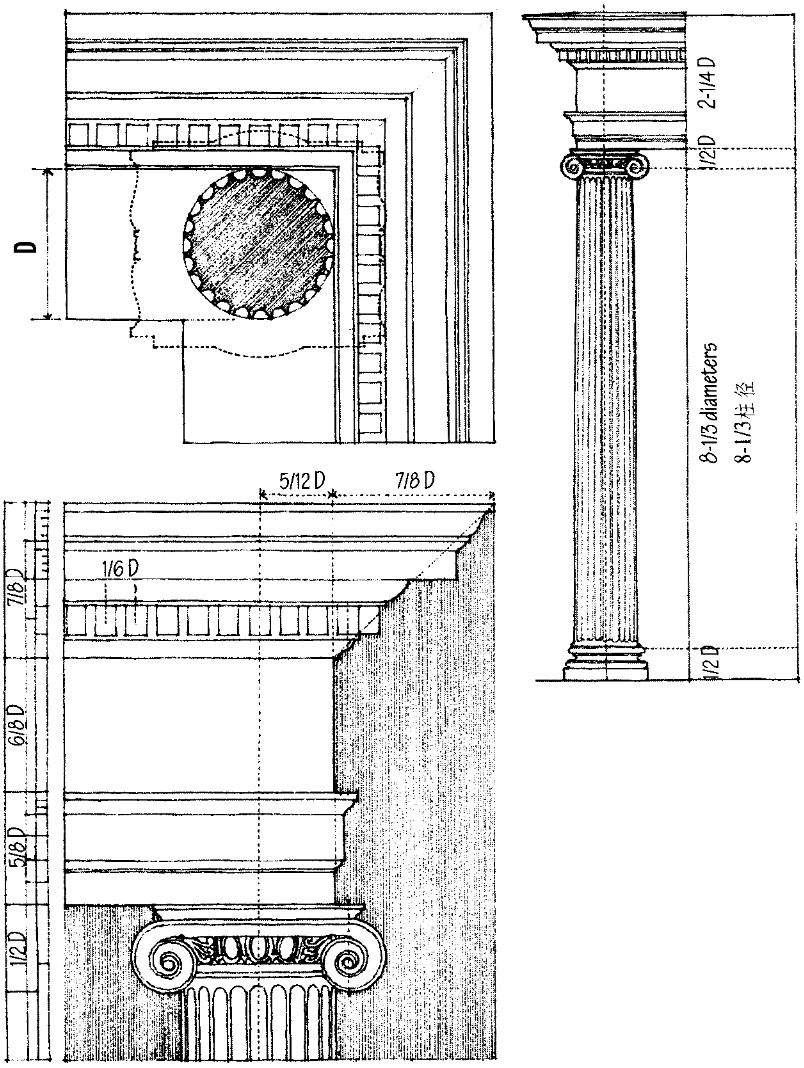
Tuscan
塔斯干式

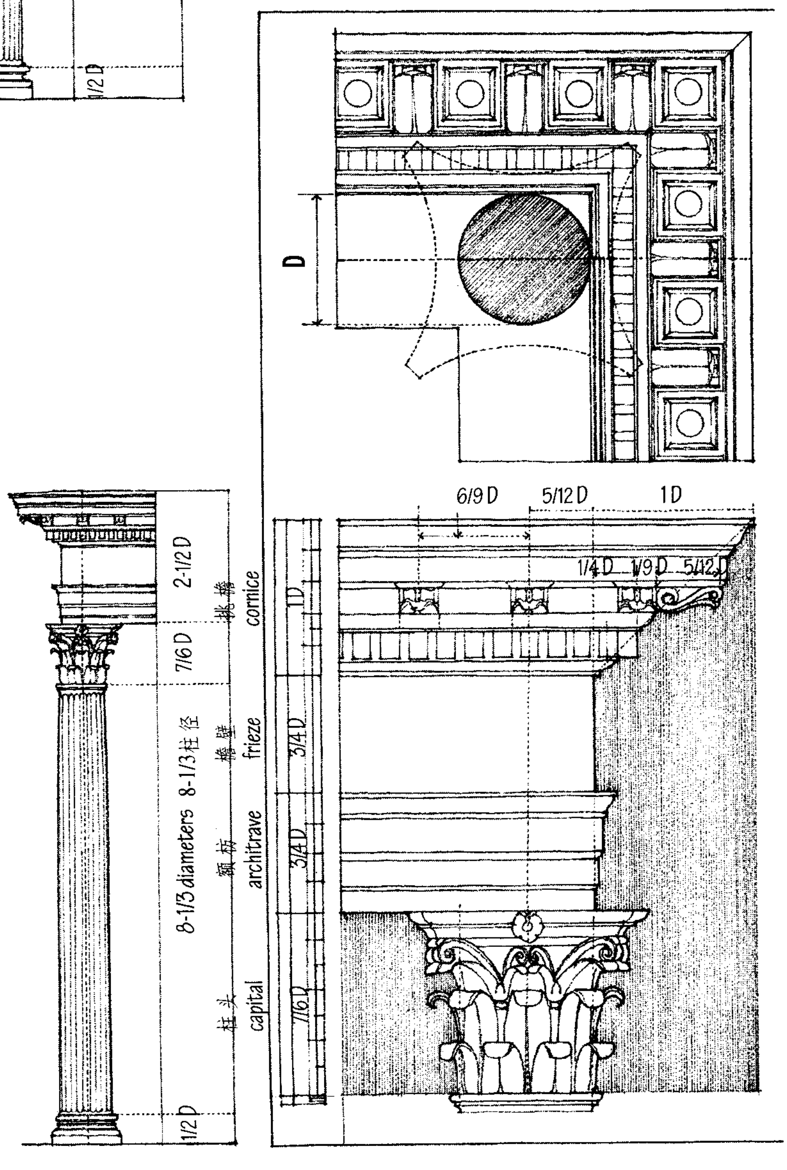
The Classical Orders according to Vignola
依据维尼奥拉提出的古典柱式



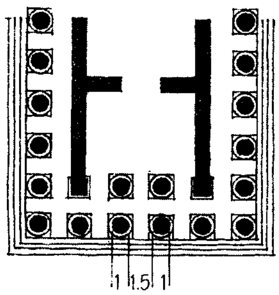
Doric
多立克式

Ionic
爱奥尼克式

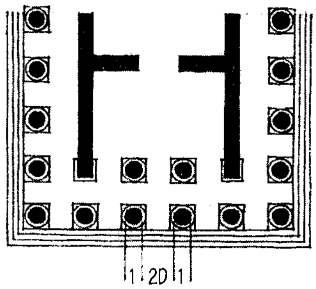




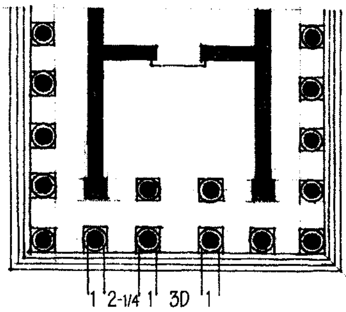
Corinthian
科林斯式



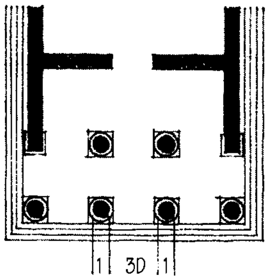
Pycnostyle
倍半式



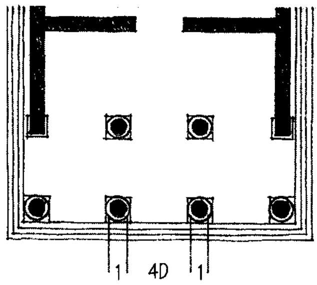
Systyle
双倍式



Eustyle
优美式



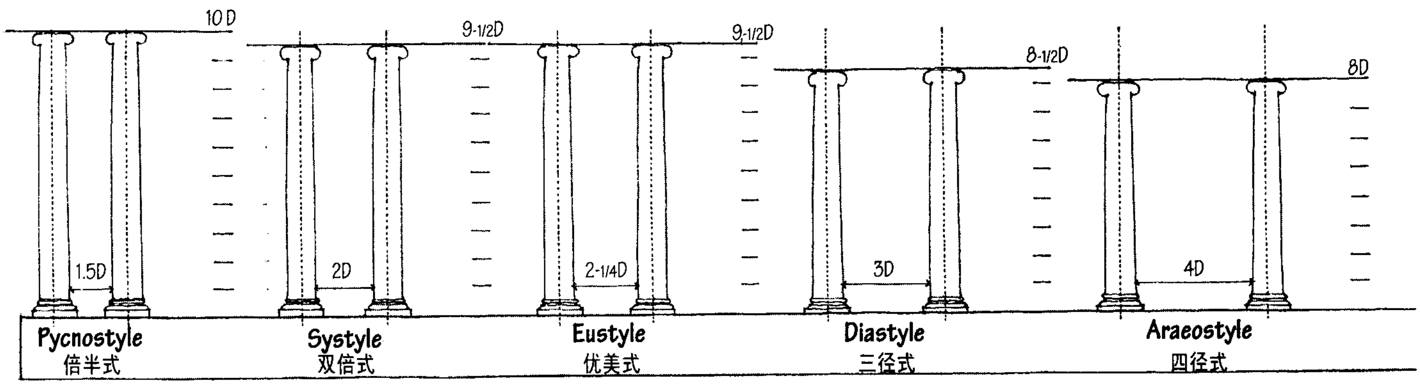
Diastyle
三径式

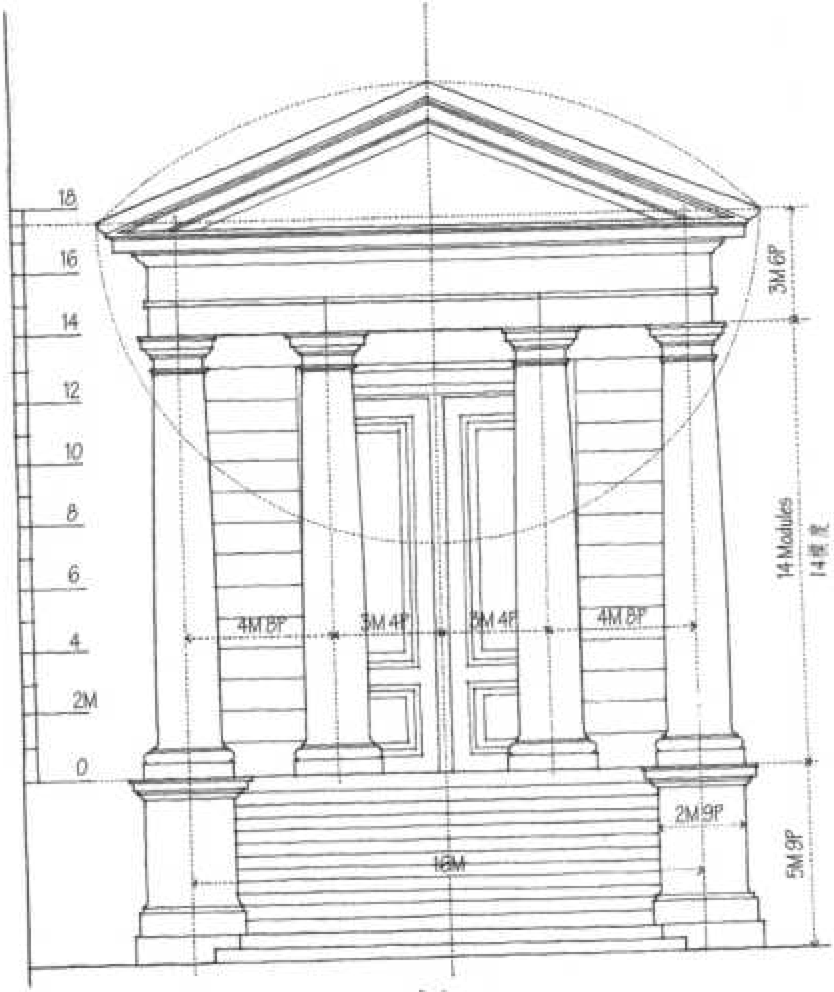


Araeostyle
四径式

Classification of Temples according to their **Intercolumniation**
按**柱距**分类的庙宇

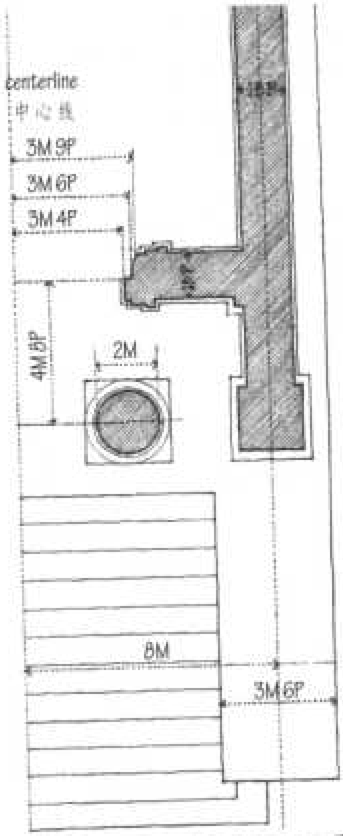
Vitruvius' Rules for the Diameter, Height, and Spacing of Columns
维特鲁威的柱径、柱高和柱距规则

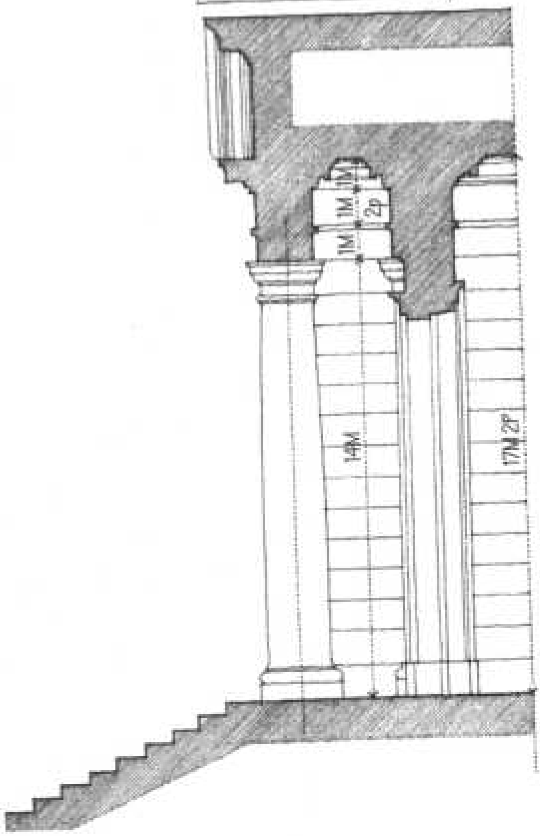


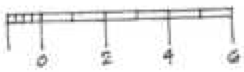


Temple Front in the **Tuscan Order**

塔斯干柱式神庙的正面

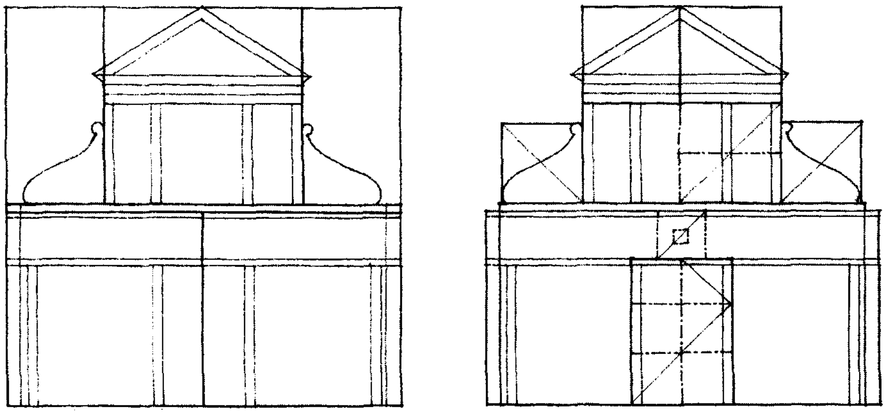






MODULES (M); 2M = 1 COLUMN DIAMETER
1/12M = 1 PART (P)

模度（用M表示）：2 M=1柱径
1/12 M=1分（用P表示）



S. Maria Novella, Florence, Italy.
Alberti designed the Renaissance facade (1456–1470) to complete a Gothic church (1278–1350).

圣玛丽亚·诺维拉教堂，佛罗伦萨，意大利
阿尔伯蒂设计的文艺复兴式立面（1456年—1470年）完善了一座哥特式教堂（1278年—1350年）。

Pythagoras discovered that the consonances of the Greek musical system could be expressed by the simple numerical progression—1, 2, 3, 4—and their ratios, 1:2, 1:3, 2:3, 3:4. This relationship led the Greeks to believe they had found the key to the mysterious harmony that pervaded the universe. The Pythagorean creed was "Everything is arranged according to numbers." Plato later developed Pythagoras' aesthetics of numbers into an aesthetics of proportion. He squared and cubed the simple numerical progression to produce the double and triple progressions, 1, 2, 4, 8, and 1, 3, 9, 27. For Plato, these numbers and their ratios not only contained the consonances of the Greek musical scale but also expressed the harmonic structure of his universe.

毕达哥拉斯发现，希腊音乐系统的和声可以用一个简单的数列表达：1，2，3，4，它们的比是1：2，1：3，2：3，3：4。这个关系使希腊人自信发现了开启大门的钥匙，找到了神秘的、宇宙间无所不在的和谐。毕达哥拉斯的信条是“万物皆数字之排列”。后来，柏拉图发展了毕达哥拉斯的数字美学，而成为比例美学。他将那个简单的数列进行平方和立方的处理，得到了比值为2和3的数列，1，2，4，8以及1，3，9，27。对柏拉图而言，这些数字以及它们的比值，不仅包含着希腊乐曲的声阶和谐，而且还表达了宇宙的和谐结构。

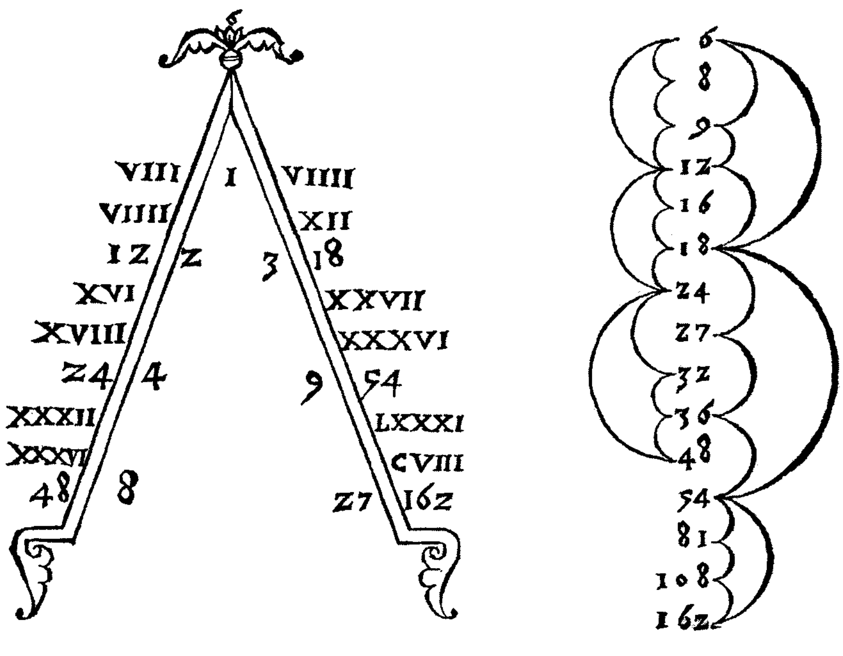


Diagram by Francesco Giorgi, 1525, illustrating the series of interlocking ratios that results from applying Pythagoras' theory of means to the intervals of the Greek musical scale.

由F. 乔治所作的**图表**，1525年，表示将毕达哥拉斯的中项定理应用于希腊音阶区间所得到的交叉比序列。

The architects of the Renaissance, believing that their buildings had to belong to a higher order, returned to the Greek mathematical system of proportions. Just as the Greeks conceived music to be geometry translated into sound, Renaissance architects believed that architecture was mathematics translated into spatial units. Applying Pythagoras' theory of means to the ratios of the intervals of the Greek musical scale, they developed an unbroken progression of ratios that formed the basis for the proportions of their architecture. These series of ratios manifested themselves not only in the dimensions of a room or a facade, but also in the interlocking proportions of a sequence of spaces or an entire plan.

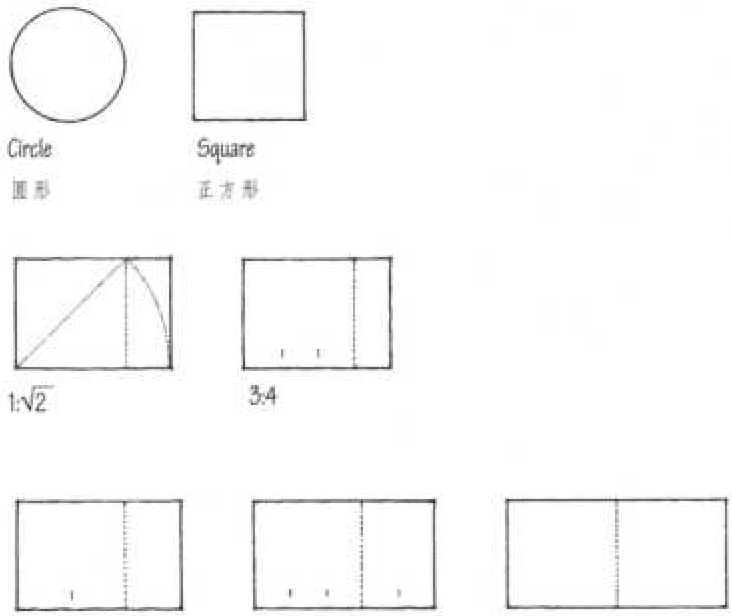
文艺复兴时期的建筑师们认为，他们的建筑应该属于一种更高的秩序，便转向了希腊的数学比例体系。正如希腊人把音乐视为几何学的声音化，文艺复兴时期的建筑师则认为，建筑学是将数学转化为空间单元。他们把毕达哥拉斯的中项定理应用于希腊音阶间隔的比值，发展成一套完整的比值数列，以此作为他们的建筑比例基础。这一系列的比值，不仅体现在一个房间或者立面的各个量度上，还体现在一个空间序列，甚至整个平面布局中连锁的比例之间。

7 Ideal Plan Shapes for Rooms.

Andrea Palladio (1508–1580) was probably the most influential architect of the Italian Renaissance. In *The Four Books on Architecture*, first published in Venice in 1570, he followed in the footsteps of his predecessors, Alberti and Serlio, and proposed these seven "most beautiful and proportionable manners of rooms."

房间的7种理想平面形状

A. 帕拉蒂奥（1508年—1580年）也许是意大利文艺复兴时期最有影响的建筑师。他的著作《建筑四书》于1570年在威尼斯问世，书中他沿着阿尔伯蒂和塞利奥前辈的足迹，提出了这7种"最优美、最合乎比例的房间样式"。

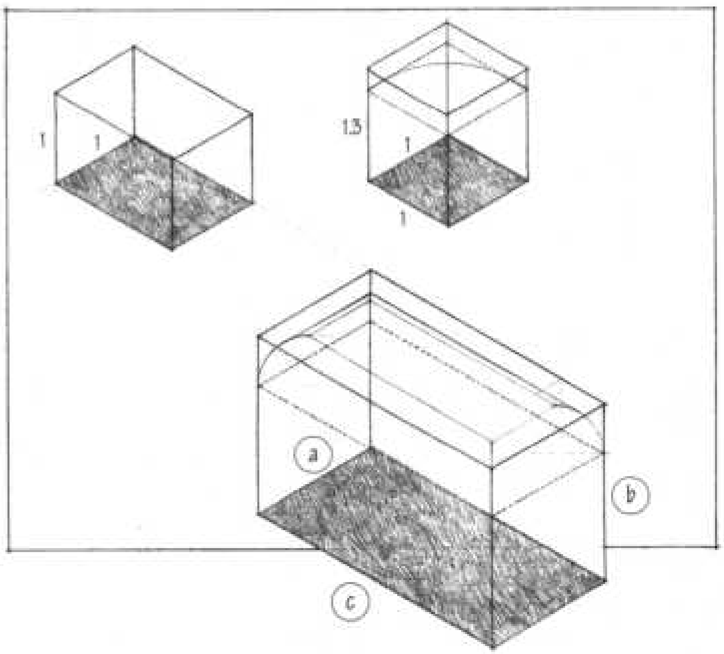


Determining the Heights of Rooms.

Palladio also proposed several methods for determining the height of a room so that it would be in proper proportion to the room's width and length. The height of rooms with flat ceilings would be equal to their width. The height of square rooms with vaulted ceilings would be one-third greater than their width. For other rooms, Palladio used Pythagoras' theory of means to determine their heights. Accordingly, there were three types of means: arithmetic, geometric, and harmonic.

房间高度的确定

帕拉蒂奥还提出了7种方法用来确定房间的高度，以使房间的高度与宽度和长度形成恰当的比例。平屋顶的房间高度应与宽度相等。带有拱顶的正方形房间，高度应比宽度多1/3。至于其他的房间，帕拉蒂奥运用毕达哥拉斯的中项定理来确定其高度。因此，有三种比例中项的内容：算术法、几何法以及谐函数：



Arithmetic:

$$\frac{c-b}{b-a} = \frac{c}{c} \text{ (e.g., 1, 2, 3 … or 6, 9, 12)}$$

算术法：$\frac{c-b}{b-a}=\frac{c}{c}$（例1，2，3……或6，9，12）

Geometric:

$$\frac{c-b}{b-a} = \frac{c}{b} \text{ (e.g., 1, 2, 4 … or 4, 6, 9)}$$

几何法：$\frac{c-b}{b-a}=\frac{c}{b}$（例1，2，4……或4，6，9）

Harmonic:

$$\frac{c-b}{b-a} = \frac{c}{a} \text{ (e.g., 2, 3, 6 … or 6, 8, 12)}$$

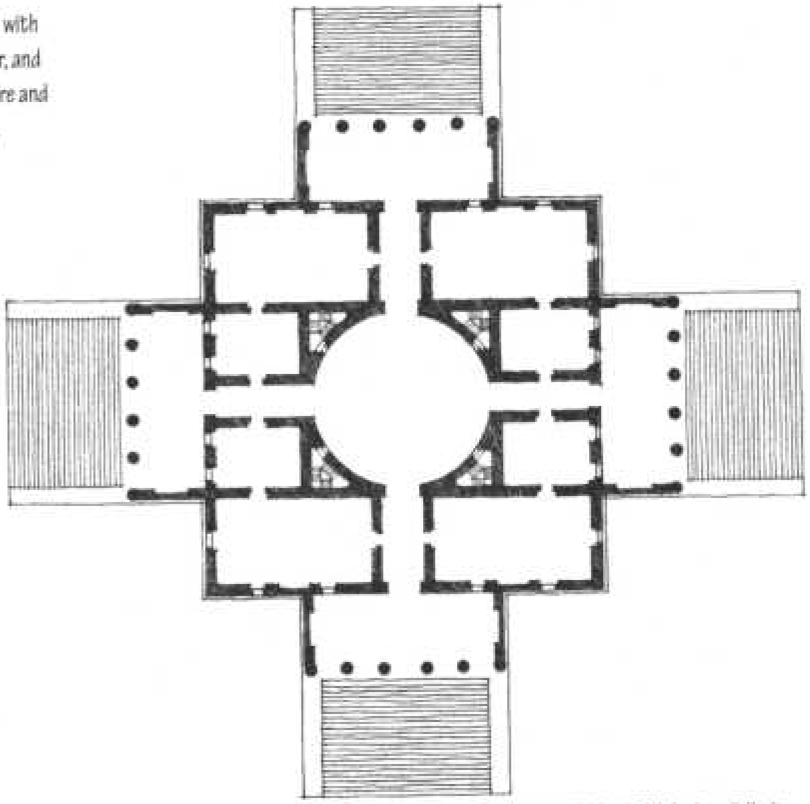
谐函数：$\frac{c-b}{b-a}=\frac{c}{a}$（例2，3，6……或6，8，12）

In each case, the height of a room is equal to the mean (b) between the two extremes of the width (a) and length (c) of the room.

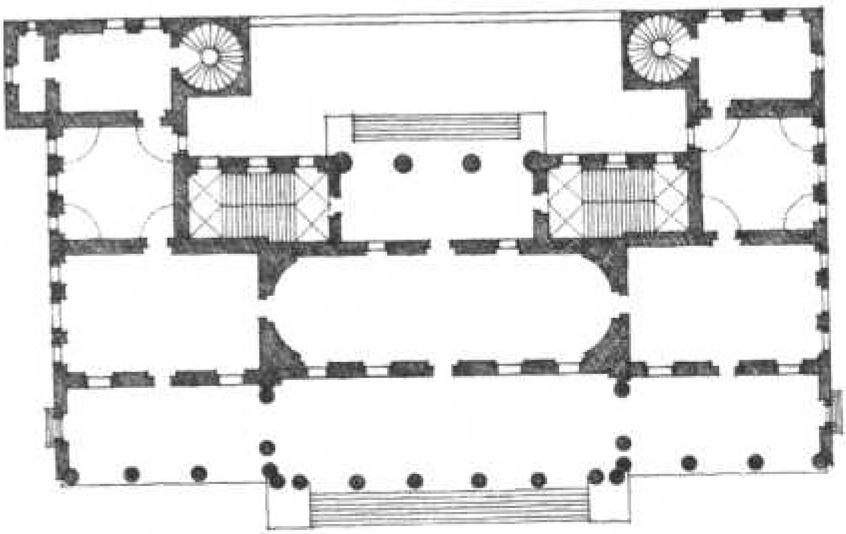
在每种情况下，房间的宽度（a）及长度（c）的两端之间的中项（b），就等于房间的高度。

"Beauty will result from the form and correspondence of the whole, with respect to the several parts, of the parts with regard to each other, and of these again to the whole; that the structure may appear an entire and complete body, wherein each member agrees with the other, and all necessary to compose what you intend to form."
Andrea Palladio, *The Four Books on Architecture*, Book I, Chapter 1.

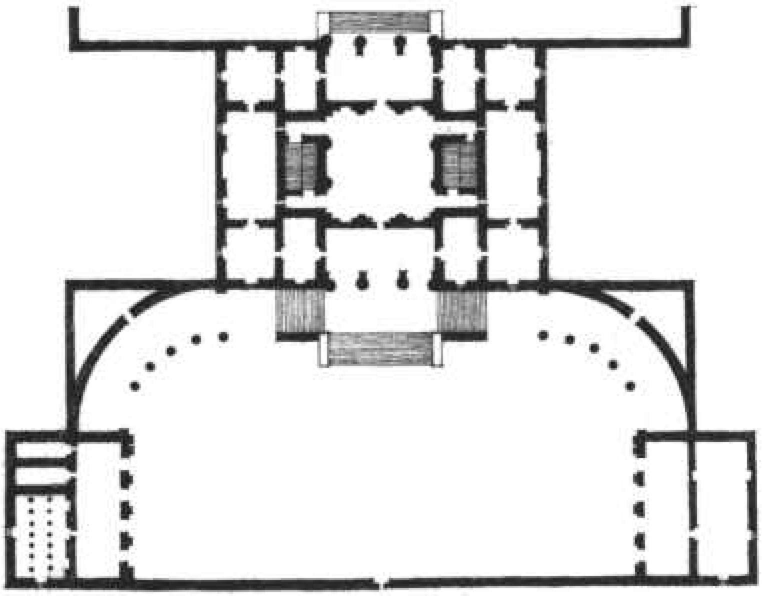
"美得之于形式，亦得之于统一，即从整体到局部，从局部到局部，再从局部到整体，彼此相呼应，如此，建筑可成为一个完美的整体。在这个整体之中，每个组成部分彼此呼应，并具备了一切条件来组成你所追求的形式。"
A. 帕拉蒂奥《建筑四书》第一卷，第一章



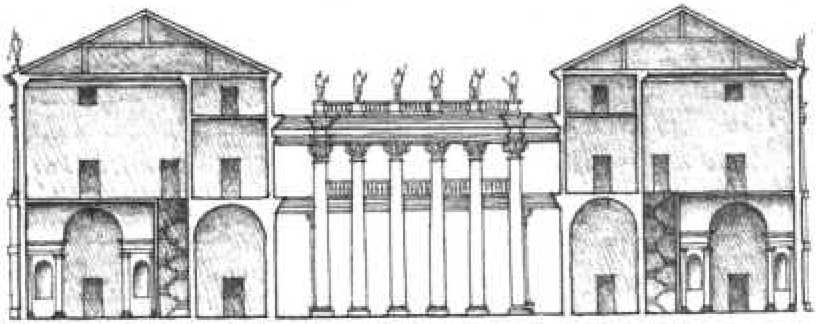
Villa Capra (The Rotunda), Vicenza, Italy, 1552–1567, Andrea Palladio
12 x 30, 6 x 15, 30 x 30
卡普拉别墅（圆厅别墅），维琴察，意大利，1552年—1567年，A. 帕拉蒂奥
12×30，6×15，30×30

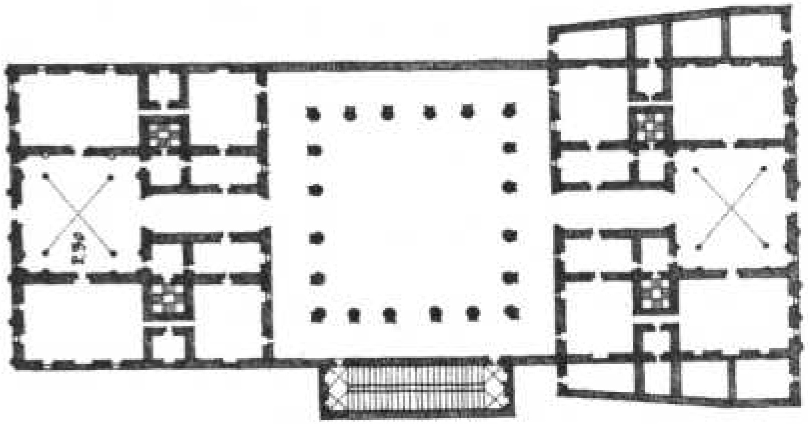


Palazzo Chiericati, Vicenza, Italy, 1550, Andrea Palladio
54 x 16 (18), 18 x 30, 18 x 18, 18 x 12
基耶里卡蒂宫，维琴察，意大利，1550年，A. 帕拉蒂奥
54×16(18)，18×30，18×18，18×12

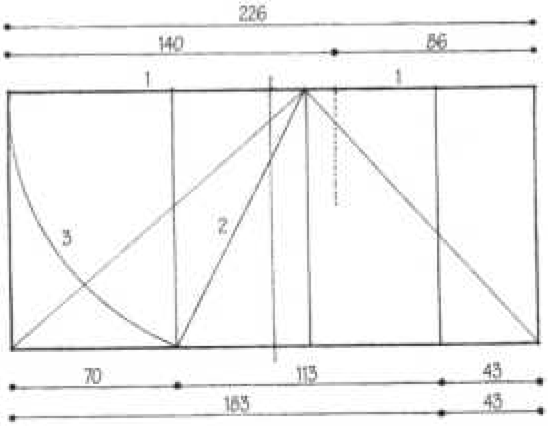


Villa Thiene, *Cicogna, Italy, 1549, Andrea Palladio*
18 x 36, 36 x 36, 36 x 18, 18 x 18, 18 x 12
桑纳别墅，辛柯纳，意大利，1549年，A.帕拉第奥
18×36，36×36，36×8，18×18，18×12





Palazzo Iseppo Porto, *Vicenza, Italy, 1552, Andrea Palladio*
30 x 30, 20 x 30, 10 x 30, 45 x 45
伊塞波·波尔图宫，维琴察，意大利，1552年，A.帕拉第奥
30×30，20×30，10×30，45×45

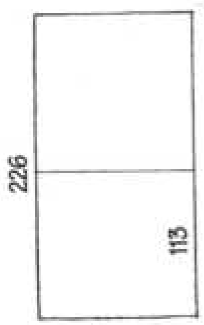


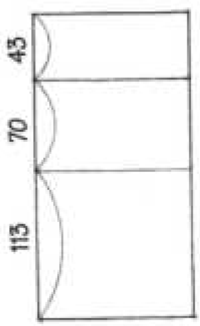
Le Corbusier developed his proportioning system, the Modulor, to order "the dimensions of that which contains and that which is contained." He saw the measuring tools of the Greeks, Egyptians, and other high civilizations as being "infinitely rich and subtle because they formed part of the mathematics of the human body, gracious, elegant, and firm, the source of that harmony which moves us, beauty." He therefore based his measuring tool, the Modulor, on both mathematics (the aesthetic dimensions of the Golden Section and the Fibonacci Series), and the proportions of the human body (functional dimensions).

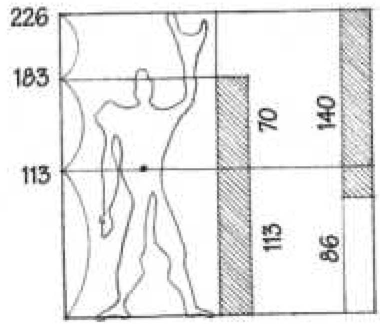
勒·柯布西埃创造了他的比例系统——模度尺，用以确定"容纳与被容纳物体的尺寸"。他把希腊人、埃及人以及其他高度文明的社会所用的度量工具视为"无比的丰富和微妙，因为它们造就了人体数学的一部分，优美、高雅，并且坚实有力；是动人心弦的和谐之源——美"。因此，勒·柯布西埃将他的度量工具——模度尺，建立在数学（黄金分割的美学量度和斐波那契数列）和人体比例（功能尺寸）的基础之上。

Le Corbusier began his study in 1942, and published *The Modulor: A Harmonious Measure to the Human Scale Universally Applicable to Architecture and Mechanics* in 1948. A second volume, *Modulor II*, was published in 1954.

柯布西埃的研究始于1942，1948年发表了《模度尺——广泛用于建筑和机械之中的人体尺度的和谐度量标准》。第二卷《模度尺II》于1954年出版。







The basic grid consist of three measures, 113, 70, and 43 centimeters, proportioned according to the Golden Section.

43 + 70 = 113

113 + 70 = 183

113 + 70 + 43 = 226 (2 x 113)

113, 183, and 226 define the space occupied by the human figure. From 113 and 226, Le Corbusier developed the Red and Blue series, diminishing scales of dimensions that were related to the stature of the human figure.

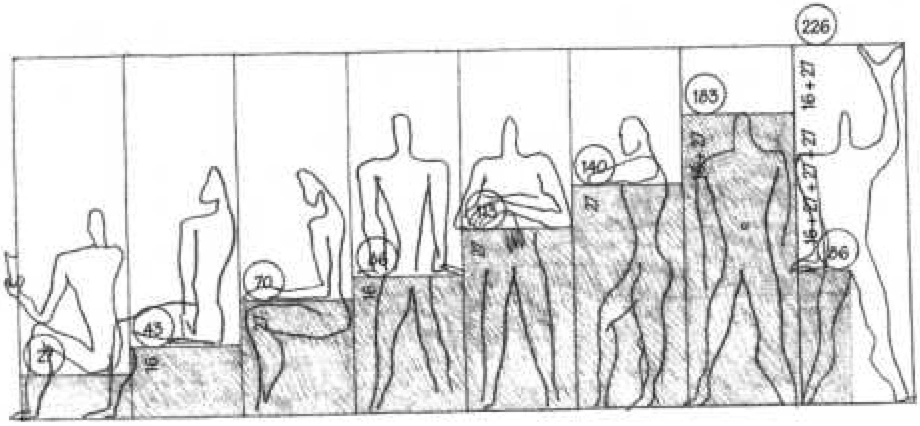
模度尺的基本网格由三个尺寸构成：113厘米、70厘米、43厘米，按黄金分割划分比例：

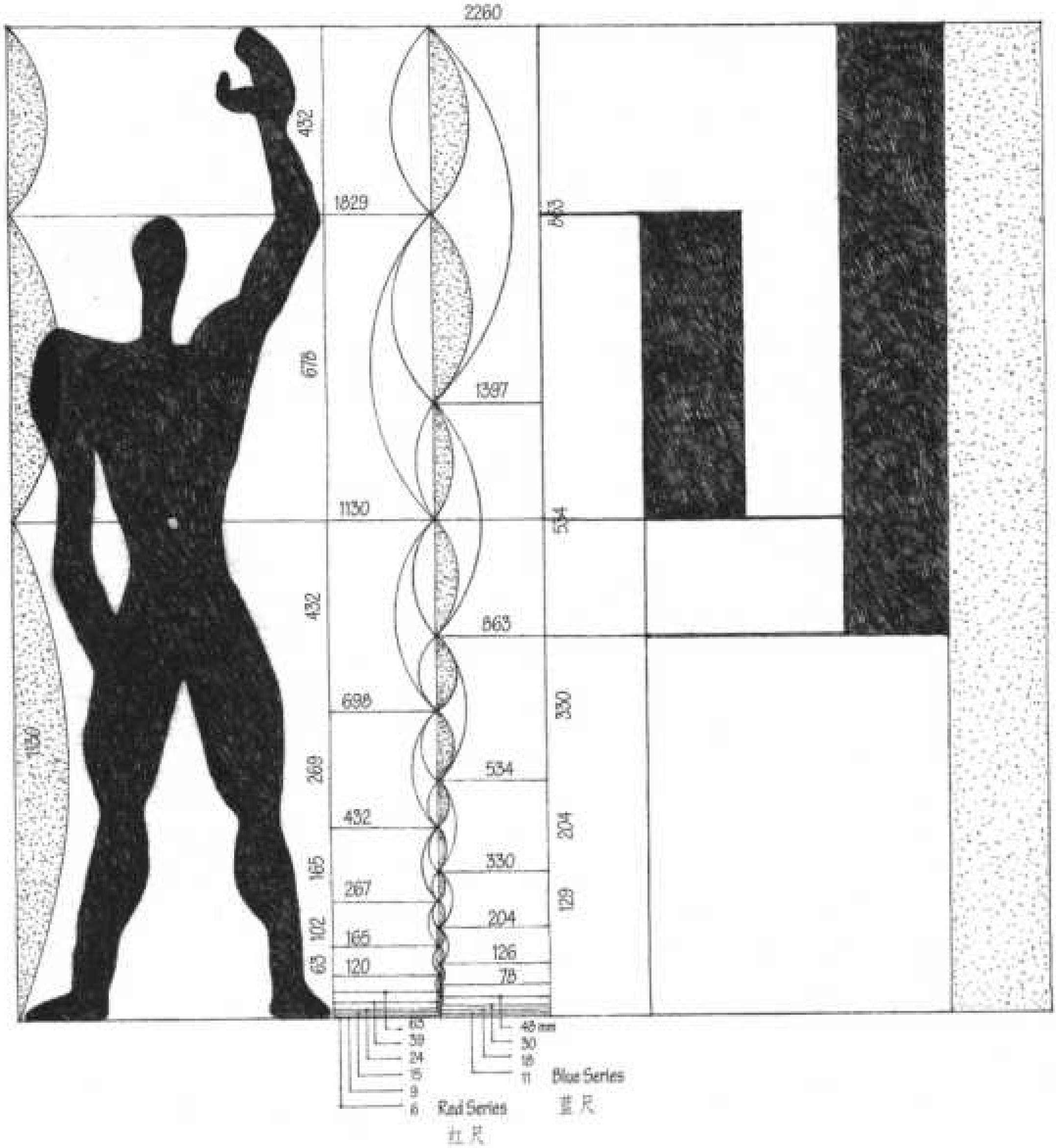
43+70=113

113+70=183

113+70+43=226（2×113）

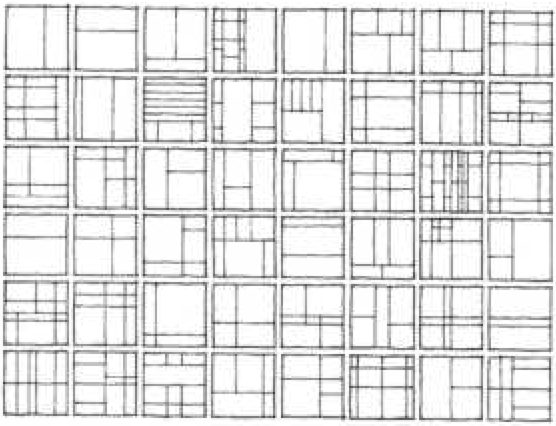
113、183、226确定了人体所占的空间。在113和226之间，柯布西埃还创造了红尺与蓝尺，用以缩小与人体高度有关的尺寸等级。



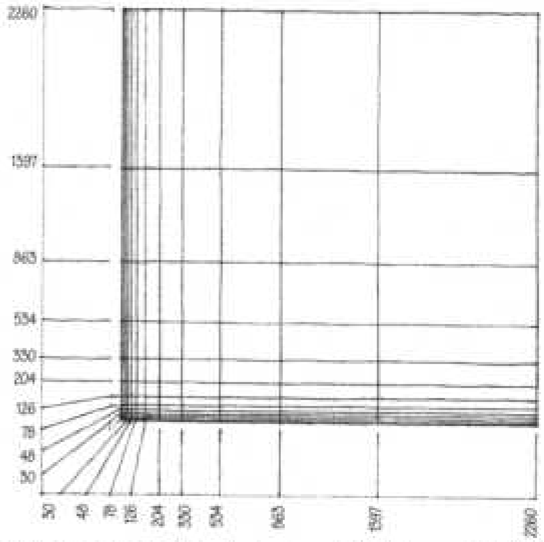


Le Corbusier saw the Modulor not merely as a series of numbers with an inherent harmony, but as a system of measurements that could govern lengths, surfaces, and volumes, and "maintain the human scale everywhere." It could "lend itself to an infinity of combinations; it ensures unity with diversity . . . the miracle of numbers."

柯布西埃不仅将模度尺看成是一系列具有内在和谐的数字，而且是一个度量体系，它支配着一切长度、表面和体积，并"在任何地方都保持着人体的尺度"。它是"无穷组合的助手，确保了变化中的统一……数字的奇迹"。





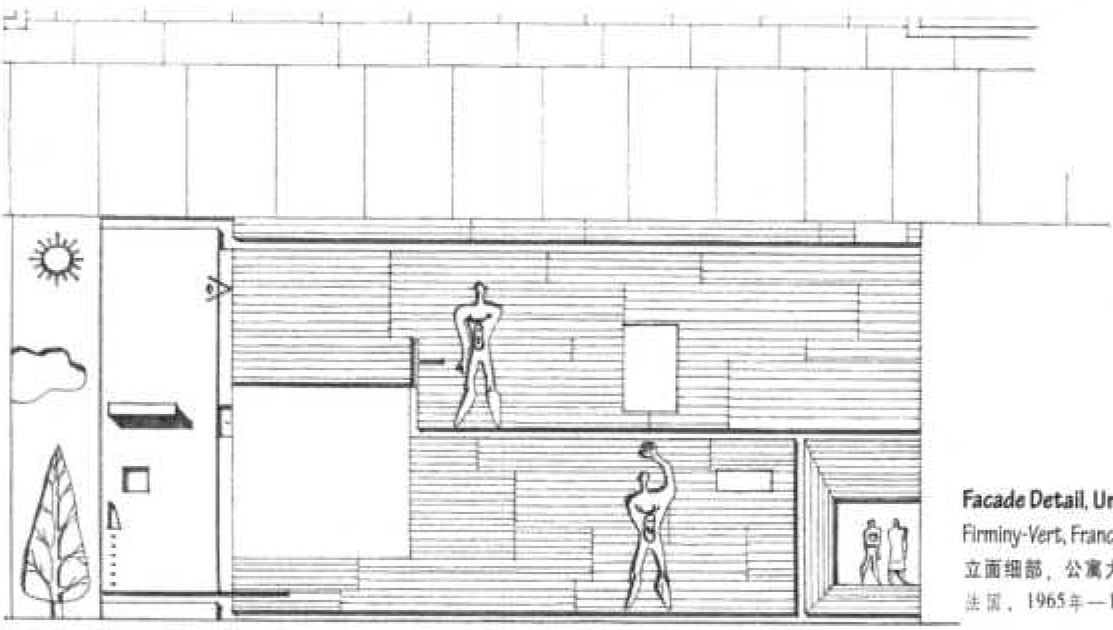


The principle work of Le Corbusier that exemplified the use of the Modulor was his Unité d'Habitation at Marseilles. It uses 15 measures of the Modulor to bring human scale to a building that is 140 meters long, 24 meters wide, and 70 meters high.

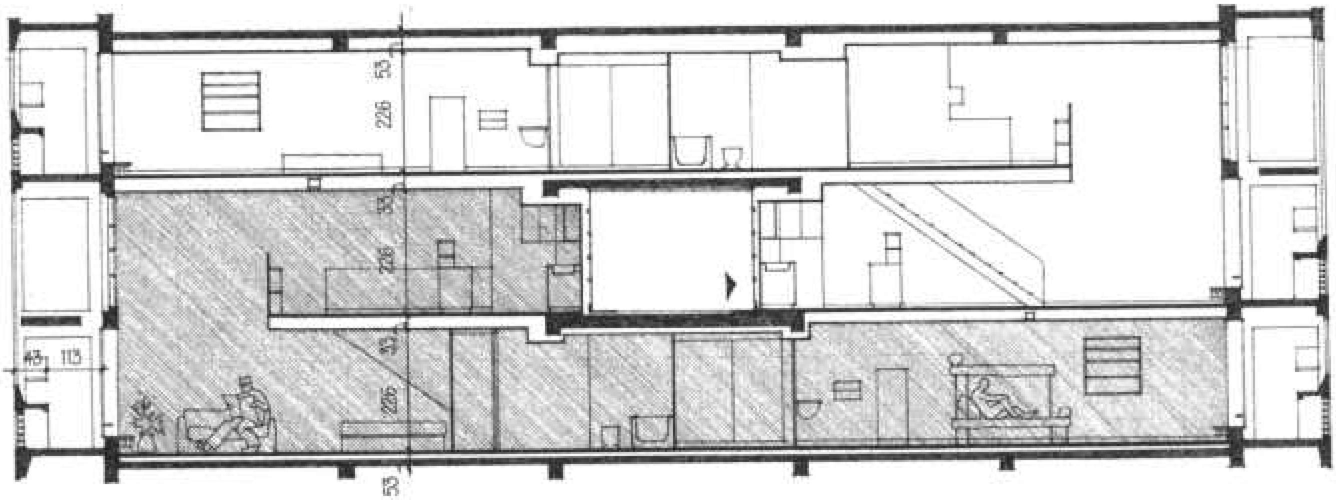
柯布西埃运用模度尺的典型作品是马赛的公寓大楼。它采用了15种模度尺的尺寸，将人体尺度运用到一个长140米、宽24米、高70米的建筑物中。

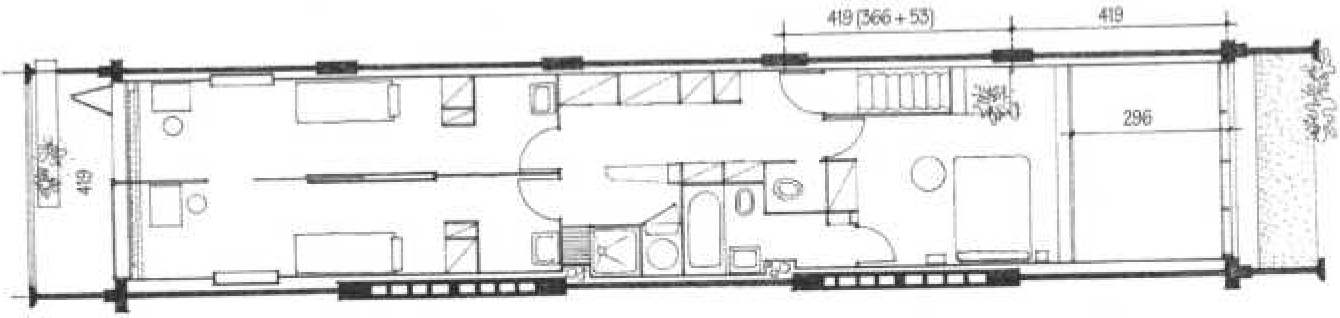
Le Corbusier used these diagrams to illustrate the diversity of panel sizes and surfaces that could be obtained with the proportions of the Modulor.

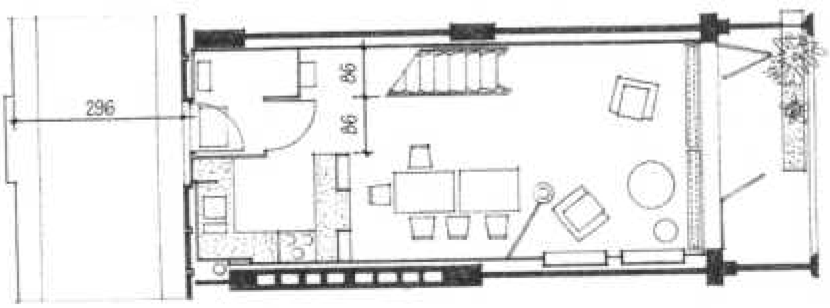
柯布西埃用这些图表说明采用模度比例能够得到的板材尺寸与表面的多样性。



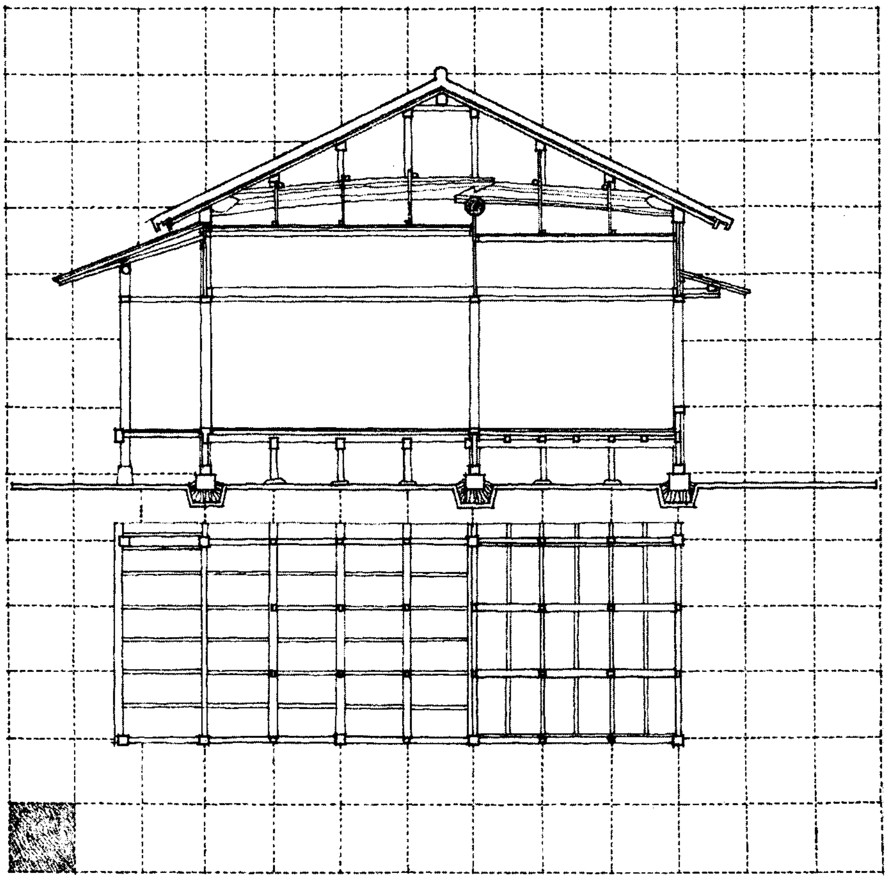
Facade Detail, Unité d'Habitation,
Firminy-Vert, France, 1965–1968, Le Corbusier
立面细部，公寓大楼，菲尔米尼—沃特，法国，1965年—1968年，勒·柯布西埃







Plans and Section of Typical Apartment Unit, Unité d'Habitation, Marseilles, 1946– 1952, Le Corbusier
典型公寓单元的平面与剖面，公寓大楼，马赛，1946年—1952年，勒·柯布西埃



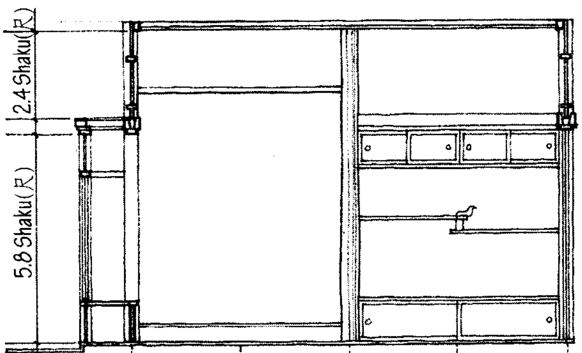
Traditional Japanese House
传统日本住宅

The traditional Japanese unit of measure, the shaku, was originally imported from China. It is almost equivalent to the English foot and divisible into decimal units. Another unit of measure, the ken, was introduced in the latter half of Japan's Middle Ages. Although it was originally used simply to designate the interval between two columns and varied in size, the ken was soon standardized for residential architecture. Unlike the module of the Classical Orders, which was based on the diameter of a column and varied with the size of a building, the ken became an absolute measurement.

传统的日本度量单位——“尺”，是从中国传入的。它几乎与英国的英尺相等，并分为十个更小的单位。另一种度量单位“间”，则是在日本中世纪下半叶传入的。虽然“间”原先的尺寸并不统一，仅用于指两柱之间的距离，但不久就成了住宅建筑的统一标准。古典柱式的模度以柱子的直径为基础，随建筑物的尺寸而变化，但“间”却不同，它是一个绝对的度量尺寸。

The ken, however, was not only a measurement for the construction of buildings. It evolved into an aesthetic module that ordered the structure, materials, and space of Japanese architecture.

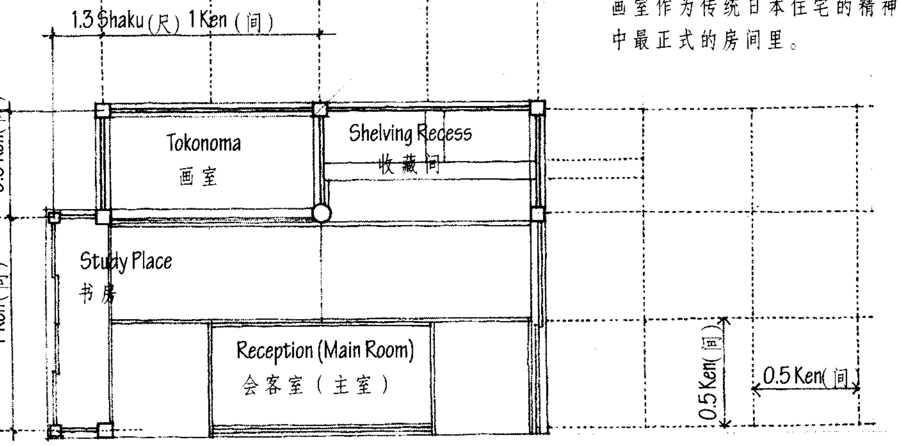
然而，“间”不仅是房屋结构的度量尺寸，而且发展成一种审美模度，确定了日本建筑的结构、材料及空间的秩序。



Elevation
立面

Tokonoma or Picture Recess, a shallow, slightly raised alcove for the display of a kakemono or flower arrangement. As the spiritual center of a traditional Japanese house, the tokonoma is located in its most formal room.

画室，或称为“藏画的地方”，是一个浅浅的、略微抬起的凹室，用来展示字画或插花。画室作为传统日本住宅的精神中心布置在住宅中最正式的房间里。



Partial Plan
平面局部

Two methods of designing with the ken modular grid developed that affected its dimension. In the Inaka-ma method, the ken grid of 6 shaku determined the center-to-center spacing of columns. Therefore, the standard tatami floor mat (3 x 6 shaku or $\frac{1}{2}$ x 1 ken) varied slightly to allow for the thickness of the columns.

"间"的模度网格，逐渐发展成为两种设计方法，这两种方法都影响到"间"的量度。"田舍间（Inaka-ma）"法中，以6尺的"间"网格确定柱子中心之间的距离。因此，标准的榻榻米地席（3×6尺或1/2×1间）就需要稍作变化，以容纳柱子的粗细。

In the Kyo-ma method, the floor mat remained constant (3.15 x 6.30 shaku) and the column spacing (ken module) varied according to the size of the room and ranged from 6.4 to 6.7 shaku.

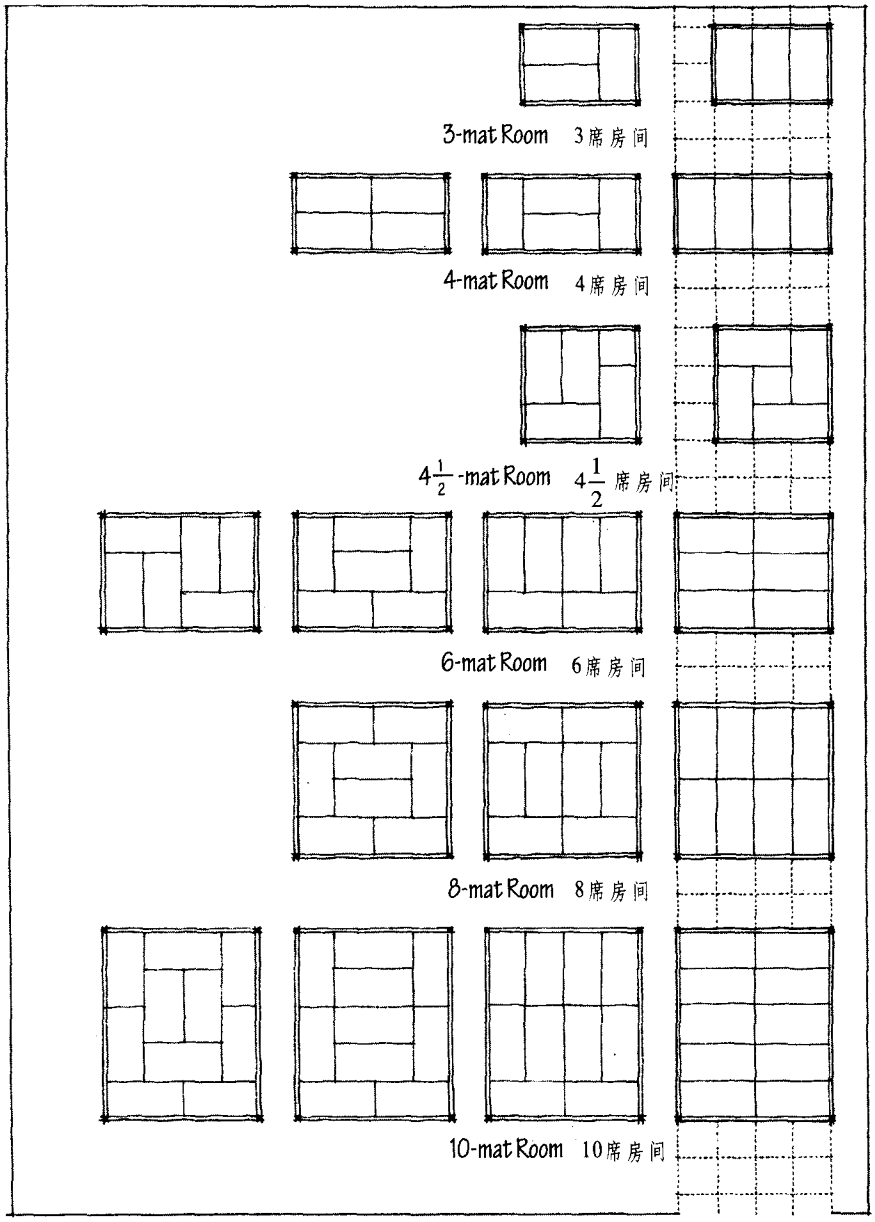
在"京间（kyo-ma）"法中，地席保持不变（3.15×6.3尺），而柱距（"间"模度）则根据房间的尺寸而变化，从6.4到6.7尺不等。

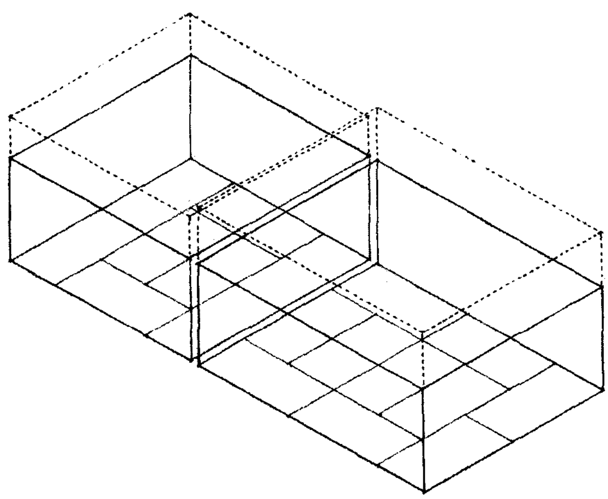
The size of a room is designated by the number of its floor mats. The traditional floor mat was originally proportioned to accommodate two persons sitting or one person sleeping. As the ordering system of the ken grid developed, however, the floor mat lost its dependence on human dimensions and was subjected to the demands of the structural system and its column spacing.

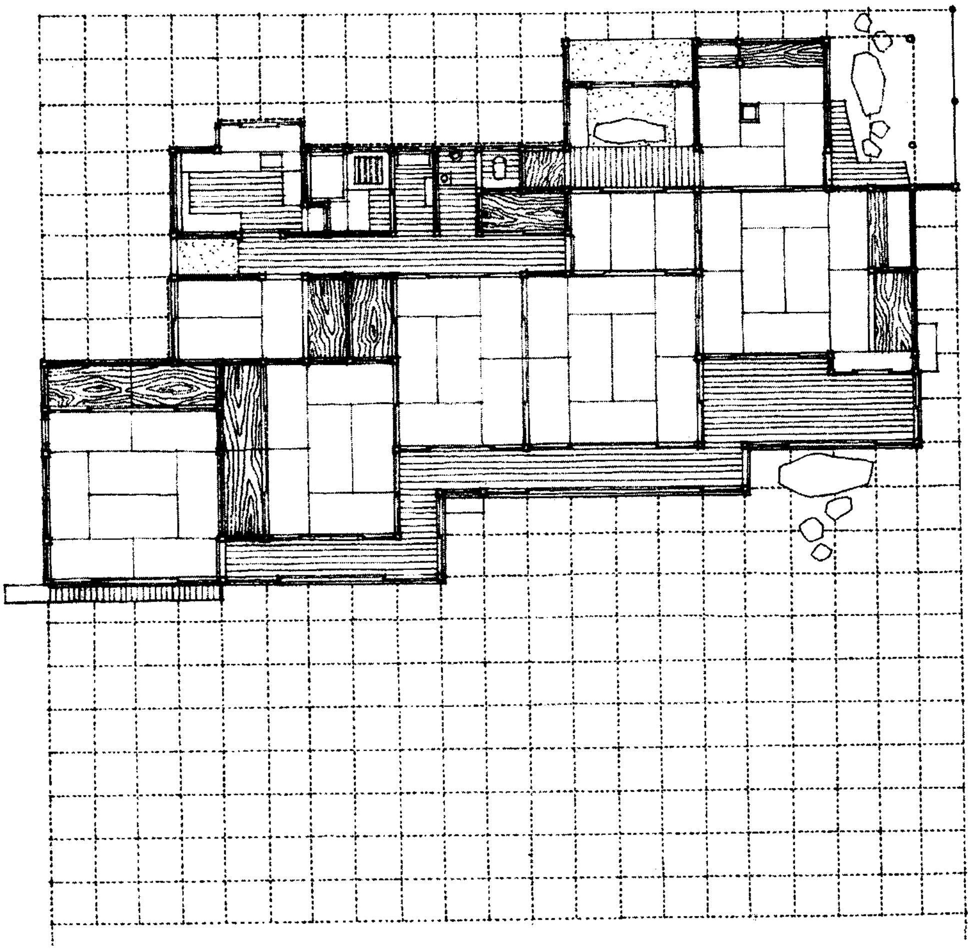
房间的尺寸由地席的数量来确定。传统的地席起先是按照坐两人或躺一人的比例关系。随着"间"网格秩序体系的发展，地席逐渐失去了对人体尺度的依赖性，而服从于结构体系和柱间距离的要求。

Because of their 1:2 modularity, the floor mats can be arranged in a number of ways for any given room size. And for each room size, a different ceiling height is established according to the following:
height of the ceiling (shaku), measured from the top of the frieze board = number of mats x 0.3.

由于地席作为一种模块，其比例为1：2，所以可以在任何给定尺寸的房间里以多种方式排列。并且，各种不同尺寸的房间，可以根据以下方法确定不同顶棚的高度：
顶棚高度（尺），从檐壁板的顶部量起=地席的数量×0.3。

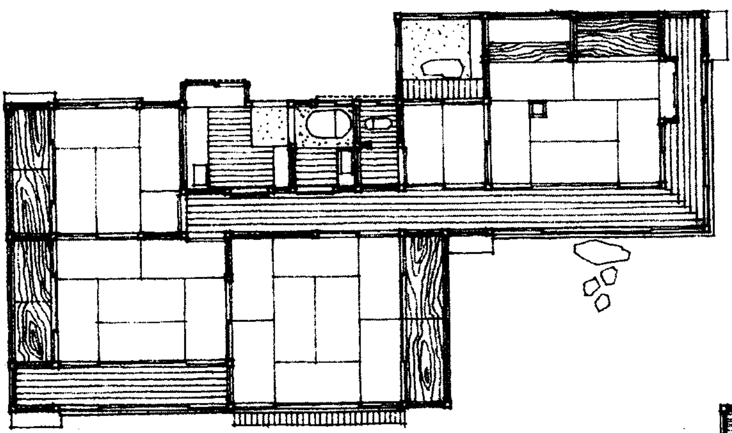


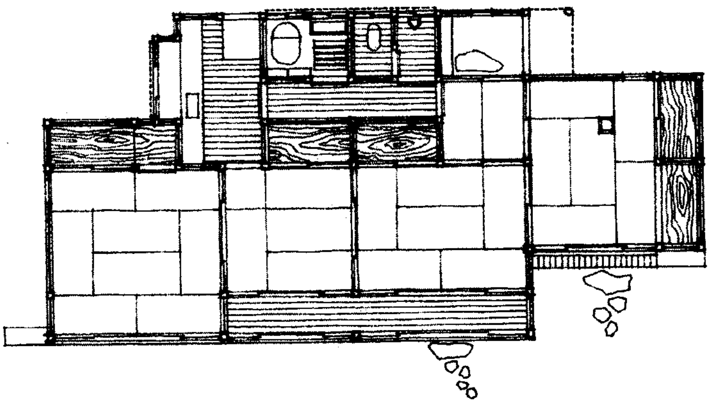




In a typical Japanese residence, the ken grid orders the structure as well as the additive, space-to-space sequence of rooms. The relatively small size of the module allows the rectangular spaces to be freely arranged in linear, staggered, or clustered patterns.

在典型的日本住宅中，“间”网格决定着结构的秩序，同时也决定着附加部分，空间到空间的房屋序列。相对较小的模度尺寸可以使长方形的空间自由布置成线式、交错式或组团式的图案。

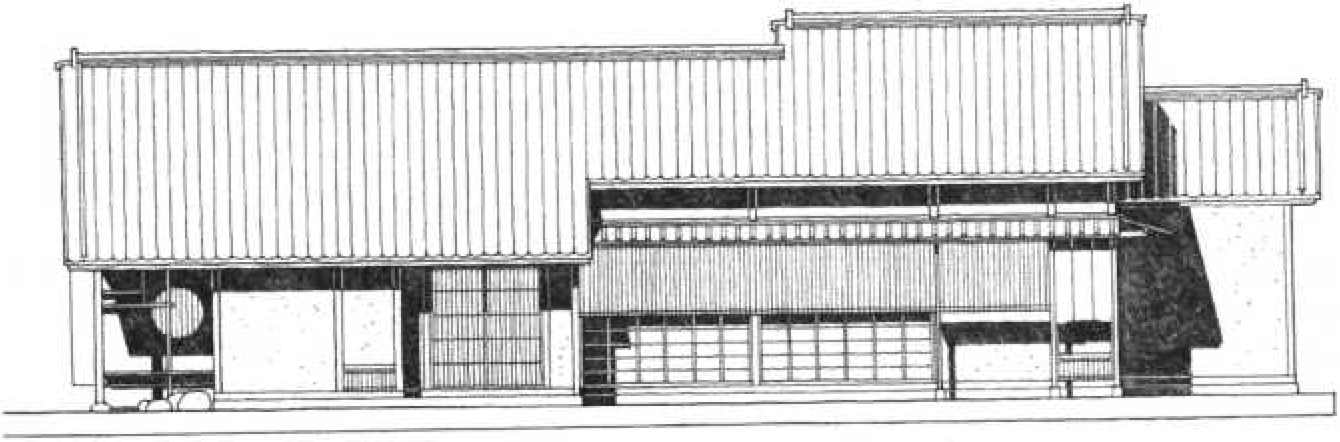




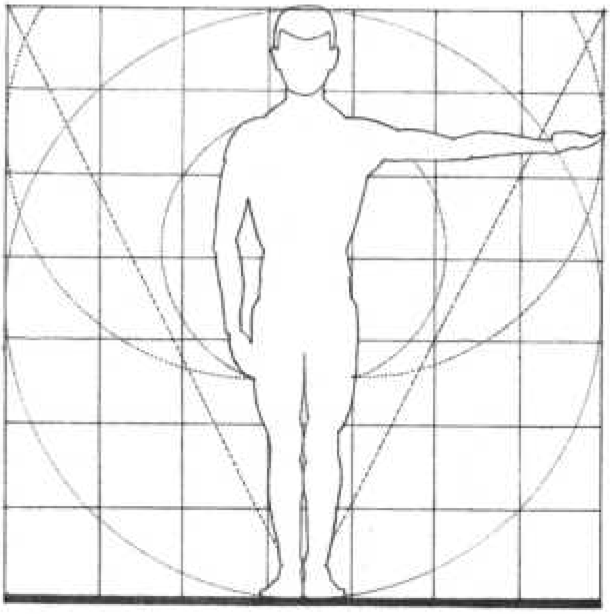
Elevations of a Traditional Japanese Residence
传统日本住宅的立面



East Elevation
东立面



North Elevation
北立面

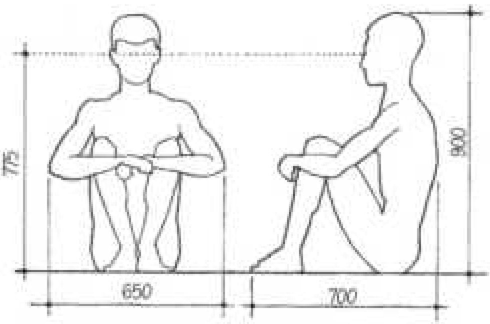


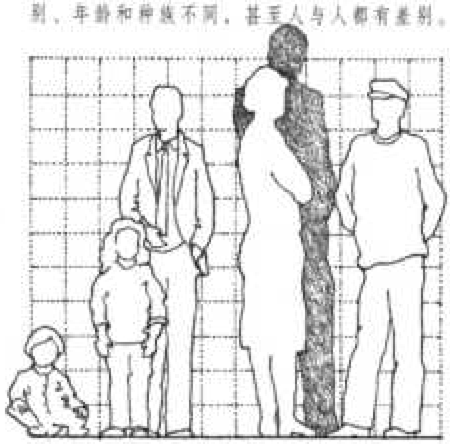
Anthropometry refers to the measurement of the size and proportions of the human body. While the architects of the Renaissance saw the proportions of the human figure as a reaffirmation that certain mathematical ratios reflected the harmony of their universe, anthropometric proportioning methods seek not abstract or symbolic ratios, but functional ones. They are predicated on the theory that forms and spaces in architecture are either containers or extensions of the human body and should therefore be determined by its dimensions.

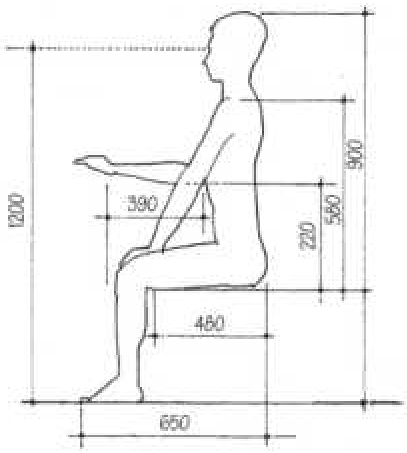
人体比例是指人体尺寸与比例的测量值。文艺复兴时期的建筑师把人体的比例看作一个明证，表明某些数学比值反映着宇宙的和谐。但人体的比例方法，寻求的不是抽象或象征意义的比值，而是功能方面的比值。它们预言了这样的理论，即建筑的形式和空间不是人体的容器就是人体的延伸，因此建筑的形式与空间应该决定于人体的尺寸。

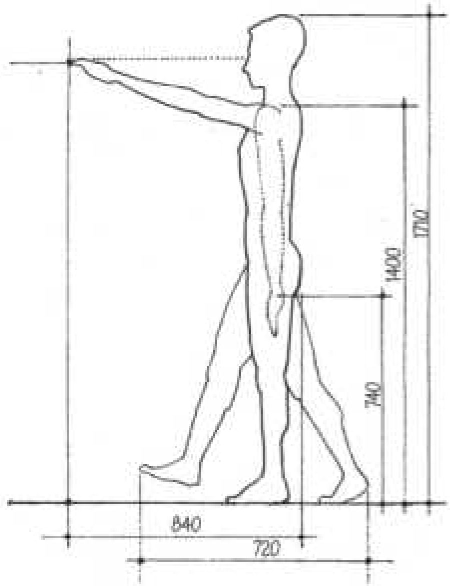
The difficulty with anthropometric proportioning is the nature of the data required for its use. For example, the dimensions given here in millimeters are average measurements and are merely guidelines which should be modified to satisfy specific user needs. Average dimensions must always be treated with caution since variations from the norm will always exist due to the difference between men and women, among various age and racial groups, even from one individual to the next.

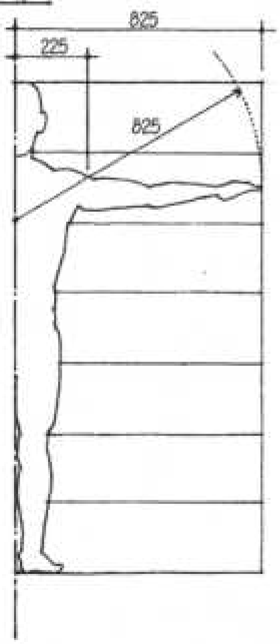
具体运用时所需要的数据性质是人体比例的困难所在。例如，图中给出的人体尺寸单位是毫米，是一个平均值，并且仅仅是一个参考值，应该不断调整以满足特殊使用者的要求。对于平均尺寸，总是应该谨慎地对待，因为相对于标准值的变化总是存在的，这是由于男女有别、年龄和种族不同，甚至人与人都有差别。





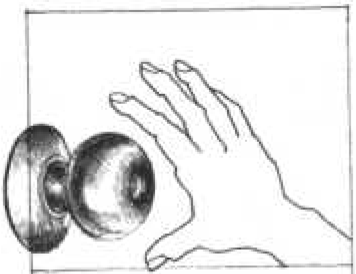


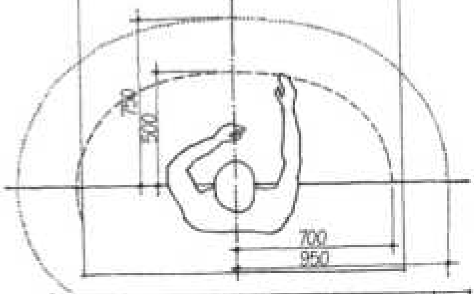


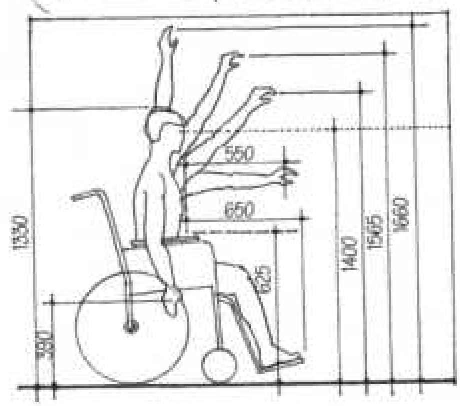


The dimensions and proportions of the human body affect the proportion of things we handle, the height and distance of things we try to reach, and the dimensions of the furnishings we use for sitting, working, eating, and sleeping. There is a difference between our structural dimensions and those dimensional requirements which result from how we reach for some-thing on a shelf, sit down at a table, walk down a set of stairs, or interact with other people. These are functional dimensions and will vary according to the nature of the activity engaged in and the social situation.

人体的尺寸和比例，影响着我们使用的物品的比例，影响着我们要触及的物品的高度和距离，也影响着我们用以坐卧、饮食和休息的家具尺寸。我们的身体结构尺寸与日常生活所需的尺寸要求之间有所不同，那些尺寸要求来自于我们如何触及货架上的物品，如何在桌边坐下来，如何走下一段楼梯或者如何与他人打交道。这些是功能性的尺寸，将随着从事的活动的性质以及社会处境而变化。

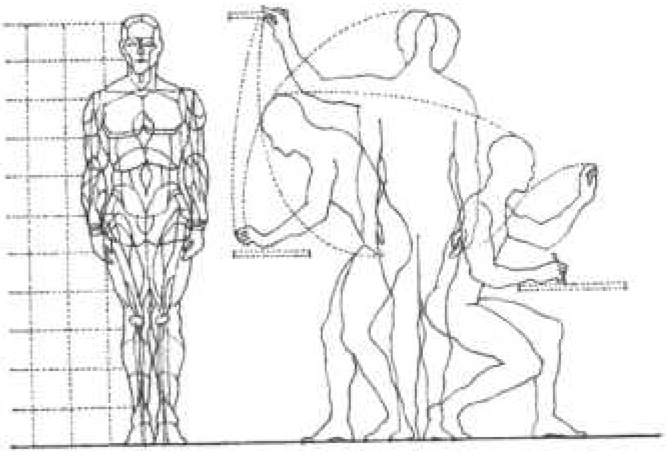


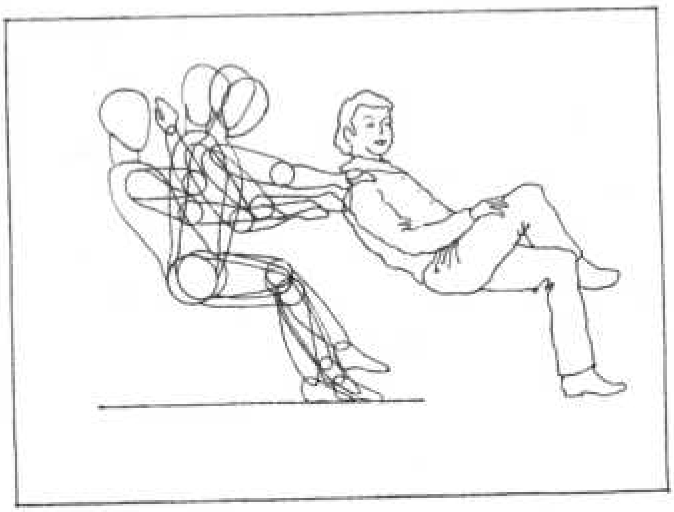




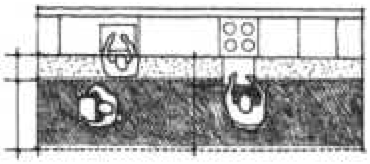
A special field that has developed from a concern with human factors is ergonomics—the applied science that coordinates the design of devices, systems, and environments with our physiological and psychological capacities and requirements.

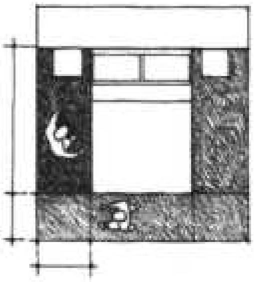
从关注人的因素出发，已经发展成一个特殊的领域，就是"人体工程学"——这是一门应用科学，目的是使机械设计、系统设计和环境设计与人体在生理和心理上的能力与要求相互协调。





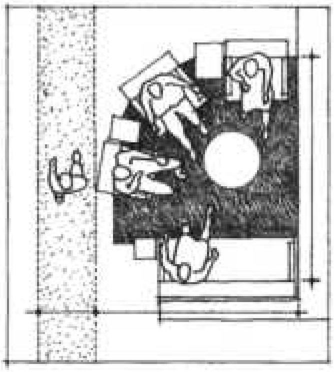


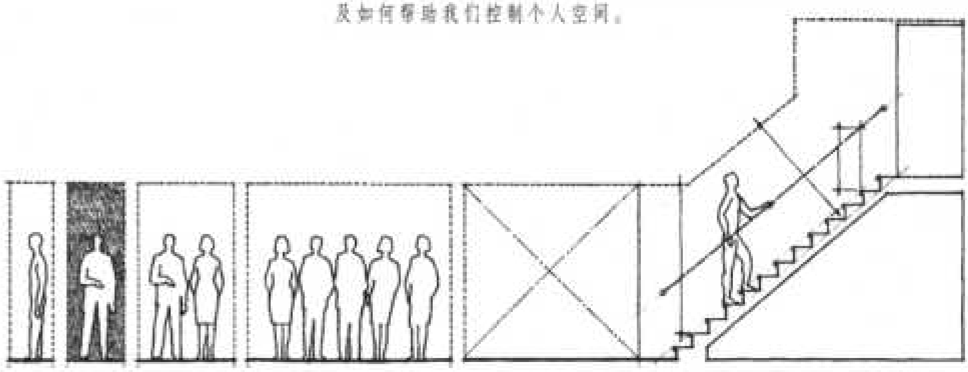


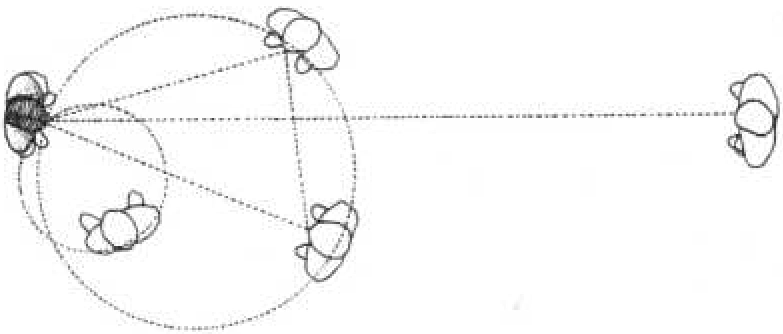


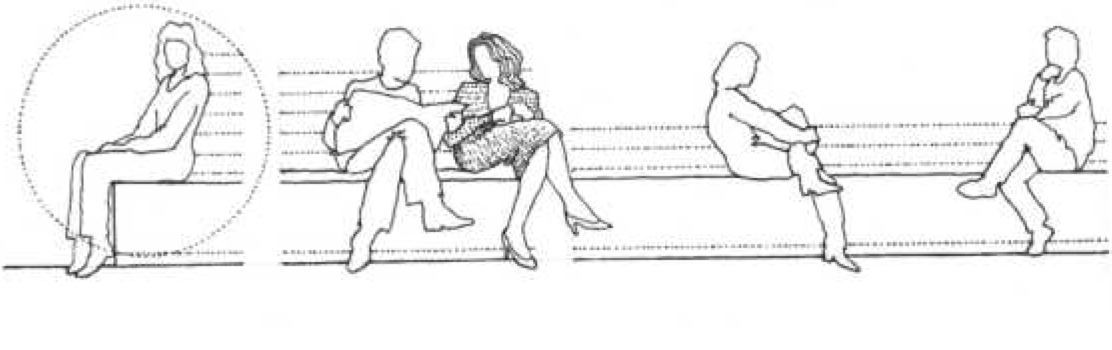
In addition to the elements that we use in a building, the dimensions of the human body also affect the volume of space we require for movement, activity, and rest. The fit between the form and dimensions of a space and our own body dimensions can be a static one as when we sit in a chair, lean against a railing, or nestle within an alcove space. There can also be a dynamic fit as when we enter a building's foyer, walk up a stairway, or move through the rooms and halls of a building. A third type of fit is how a space accommodates our need to maintain appropriate social distances and to have control over our personal space.

除了在建筑中我们使用的这些要素之外，人体尺寸还影响着我们行走、活动和休息所需要的空间体积。当我们坐在椅子上、倚靠在护栏上或寄身于亭榭空间中时，空间形式和尺寸与人体尺寸的适应关系可以是静态的。而当我们步入建筑物的大厅、走上楼梯或穿过建筑物的房间与厅堂时，这种适应关系则可以是动态的。第三种类型的适应是，空间如何能够满足我们保持合适的社交距离的需要，以及如何帮助我们控制个人空间。









While proportion pertains to an ordered set of mathematical relationships among the dimensions of a form or space, scale refers to how we perceive or judge the size of something in relation to something else. In dealing with the issue of scale, therefore, we are always comparing one thing to another.

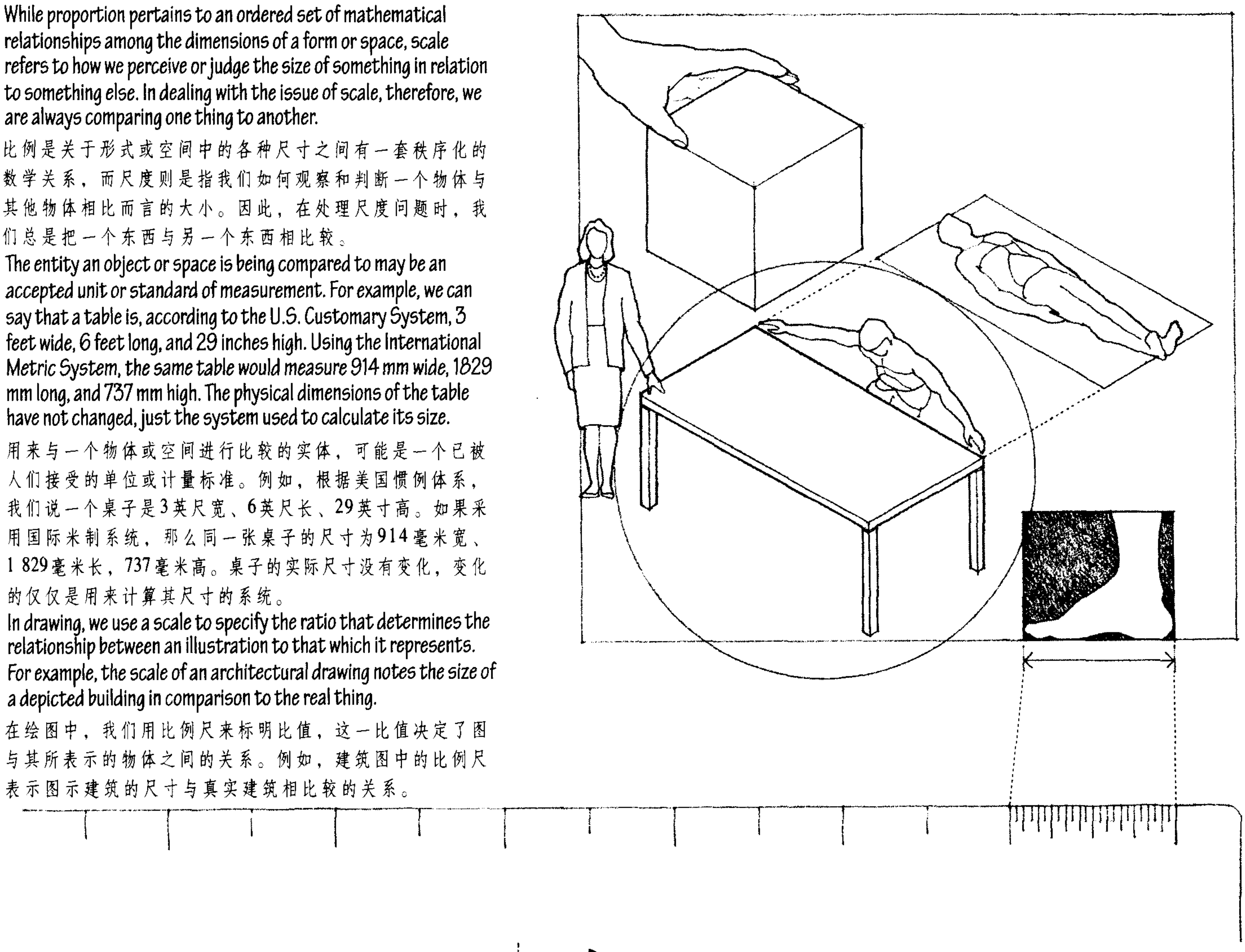
比例是关于形式或空间中的各种尺寸之间有一套秩序化的数学关系，而尺度则是指我们如何观察和判断一个物体与其他物体相比而言的大小。因此，在处理尺度问题时，我们总是把一个东西与另一个东西相比较。

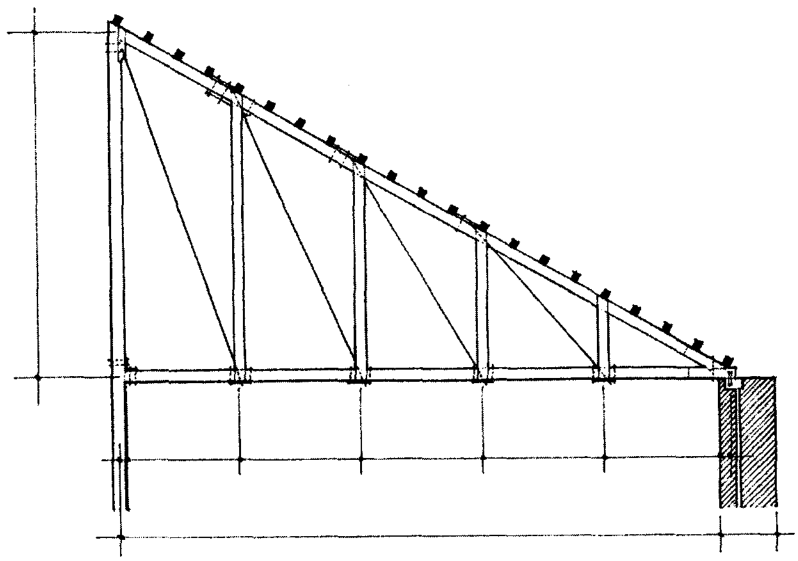
The entity an object or space is being compared to may be an accepted unit or standard of measurement. For example, we can say that a table is, according to the U.S. Customary System, 3 feet wide, 6 feet long, and 29 inches high. Using the International Metric System, the same table would measure 914 mm wide, 1829 mm long, and 737 mm high. The physical dimensions of the table have not changed, just the system used to calculate its size.

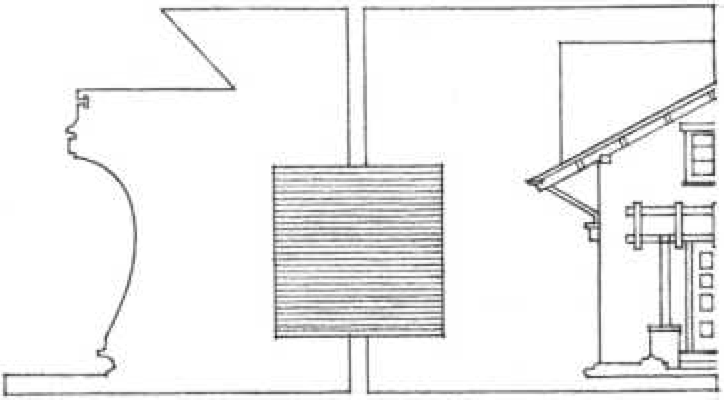
用来与一个物体或空间进行比较的实体，可能是一个已被人们接受的单位或计量标准。例如，根据美国惯例体系，我们说一个桌子是3英尺宽、6英尺长、29英寸高。如果采用国际米制系统，那么同一张桌子的尺寸为914毫米宽、1 829毫米长，737毫米高。桌子的实际尺寸没有变化，变化的仅仅是用来计算其尺寸的系统。

In drawing, we use a scale to specify the ratio that determines the relationship between an illustration to that which it represents. For example, the scale of an architectural drawing notes the size of a depicted building in comparison to the real thing.

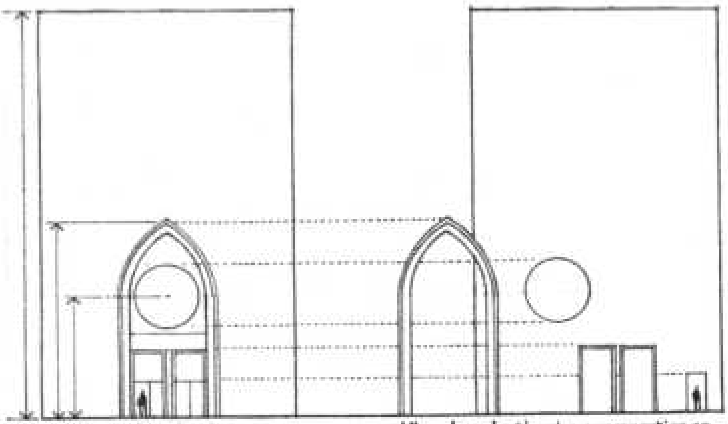
在绘图中，我们用比例尺来标明比值，这一比值决定了图与其所表示的物体之间的关系。例如，建筑图中的比例尺表示图示建筑的尺寸与真实建筑相比较的关系。







How large is this square?
这个正方形有多大？

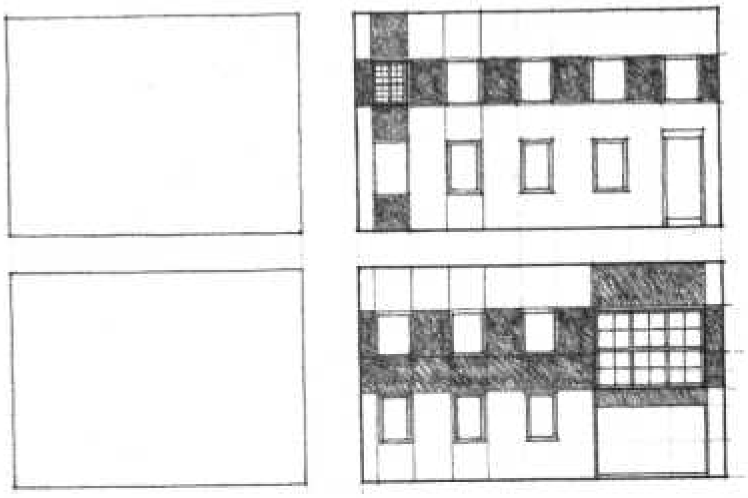


Mechanical scale: the size or proportion of something relative to an accepted standard of measurement.

机械尺度：与一个已被人们接受的计量标准相比，某物的比例或尺寸。

Visual scale: the size or proportion an element appears to have relative to other elements of known or assumed size.

视觉尺度：相对于其他已知要素或假定的尺寸，一个要素看上去所具有的尺寸或比例。



Of particular interest to designers is the notion of visual scale, which refers not to the actual dimensions of things, but rather to how small or large something appears to be in relation to its normal size or to the size of other things in its context.

设计师特别感兴趣的是视觉尺度的说法，它并不是指物品的实际尺寸，而是指某物与其正常尺寸或环境中其他物品的尺寸相比较时，看上去是大还是小。

When we say something is small-scale or miniature, we usually mean that thing appears to be smaller than its usual size. Likewise, something that is large-scale is perceived as being larger than what is normal or expected.

当我们说某物尺度小或微不足道时，我们通常是指该物看上去比其通常尺寸要小。同样，某物尺度大，则是因为它看上去比正常尺寸或预想的尺寸大。

We speak of urban scale when we refer to the size of a project in the context of a city, or neighborhood scale when we judge a building appropriate to its locale within a city, or street scale when we note the relative sizes of elements fronting a roadway.

当我们谈到某一方案的规模是以城市为背景时，我们所说的就是城市尺度；当我们判断一栋建筑是否适合它所在的城市位置时，我们所说的是邻里尺度；当我们注重沿街要素的相对大小时，我们所说的就是街道尺度。

At the scale of a building, all elements, no matter how plain or unimportant they may be, have a certain size. Its dimensions may be predetermined by the manufacturer, or they may be selected by the designer from a range of choices. Nevertheless, we perceive the size of each element in relation to other parts or to the whole of a composition.

关于一栋建筑的尺度，所有要素，无论它是多么平常或不重要，都具有确定的尺寸。其量度或许已被生产商提前决定，或者它们也许是设计师从众多选择中挑选而来的。无论如何，我们是在与作品的其他局部或整体的比较中观察每个要素的。

For example, the size and proportion of windows in a building facade are visually related to one another as well as to the spaces between them and the overall dimensions of the facade. If the windows are all of the same size and shape, they establish a scale relative to the size of the facade.

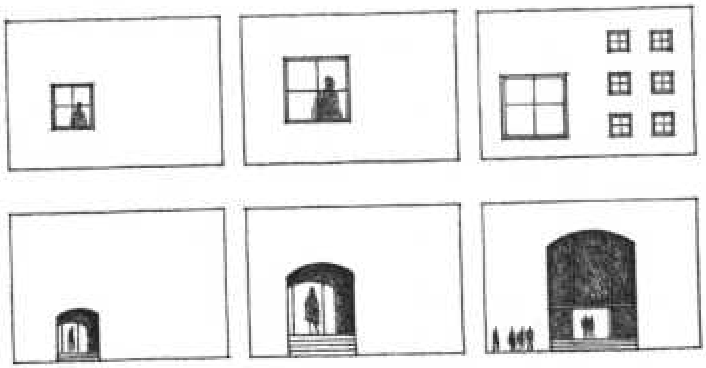
例如，建筑立面上窗户的大小和比例在视觉上与其他窗户，以及窗户之间的空间和立面的整个大小有关。如果所有窗户的大小和形状都一样，那么与立面的大小相比，它们就形成了一种尺度。

If, however, one of the windows is larger than the others, it would create another scale within the composition of the facade. The jump in scale could indicate the size or significance of the space behind the window, or it could alter our perception of the size of the other windows or the overall dimensions of the facade.

然而，如果有一个窗户比其他窗户大，它将在立面构成中产生另外一个尺度。尺度间的跳跃可以表明窗户背后空间的大小和重要性，或者它可以改变我们对于其余窗户大小的感知，或者改变我们对于立面总体尺寸的感知。

Many building elements have sizes and characteristics that are familiar to us and which we use to gauge the sizes of other elements around them. Such elements as residential window units and doorways help give us an idea of how large a building is and how many stories it has. Stairs and certain modular materials, such as brick and concrete block, help us measure the scale of a space. Because of their familiarity, these elements, if oversized, can also be used to deliberately alter our perception of the size of a building form or space.

许多建筑要素的尺寸和特点是我们所熟知的，因而能帮助我们衡量周围其他要素的大小。像住宅的窗户单元和门口能使我们想象出房子有多大，有多少层；楼梯或某些模度化的材料，如砖或混凝土块，帮助我们度量空间的尺度。正是因为这些要素为人们所熟悉，因此，这些要素如果过大，也能有意识地用来改变我们对于建筑形体或空间大小的感知。



Some buildings and spaces have two or more scales operating simultaneously. The entrance portico of the library at the University of Virginia, modeled after the Pantheon in Rome, is scaled to the overall building form while the doorway and windows behind it are scaled to the size of the spaces within the building.

有些建筑物和空间具有两种或多种尺度同时发挥作用。弗吉尼亚大学图书馆的入口门廊，模仿罗马的万神庙，它决定了整个建筑形式的尺度，同时门廊后面入口和窗户的尺度则适合建筑内部空间的尺寸。

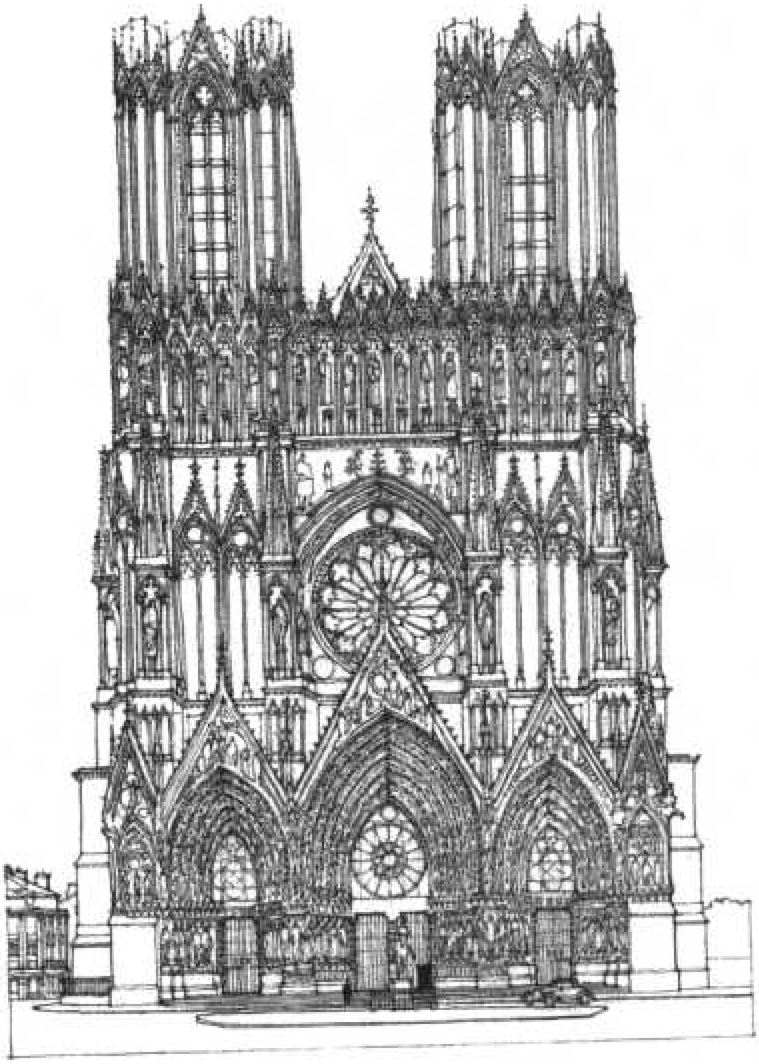


University of Virginia, Charlottesville, 1817–1826, Thomas Jefferson

弗吉尼亚大学，夏洛茨维尔，1817年—1826年，T. 杰斐逊

The recessed entry portals of Reims Cathedral are scaled to the dimensions of the facade and can be seen and recognized at a distance as the entrances to the interior space of the church. As we get closer, however, we see that the actual entrances are really simple doors within the larger portals and are scaled to our dimensions, to a human scale.

兰斯大教堂向后退缩的入口门拱，是以立面的尺寸为尺度的，而且在很远的地方就能看到和辨认出来是进入教堂内部空间的入口。但是，当我们走近时就会发现，实际的入口只不过是巨大门拱里的一些简单的门，而这些门是以我们本身的尺寸——人体尺度为尺度的。



Reims Cathedral, 1211–1290

兰斯教堂，1211年—1290年

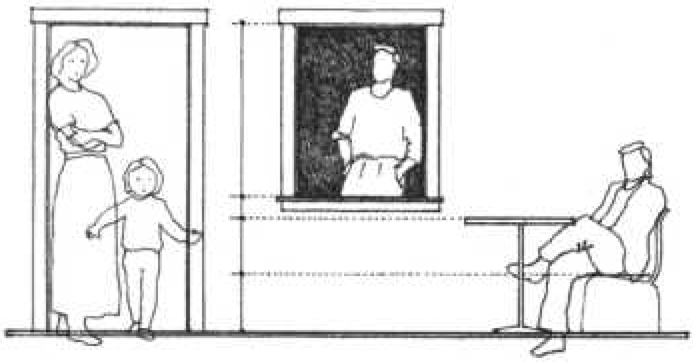


Human scale in architecture is based on the dimensions and proportions of the human body. It has already been mentioned in the section on anthropometric proportioning that our dimensions vary from individual to individual and should not be used as an absolute measuring device. We can, however, gauge a space whose width is such that we can reach out and touch its walls. Similarly, we can judge its height if we can reach up and touch the ceiling plane overhead. Once we can no longer do these things, we must rely on visual rather than tactile clues to give us a sense of the scale of a space.

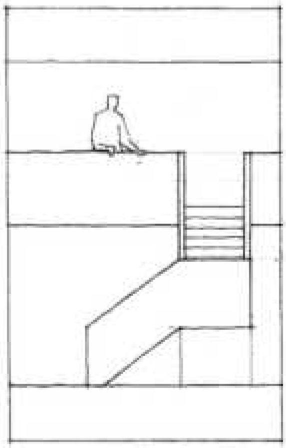
在建筑中，人体尺度是建立在人体尺寸和比例的基础上的。在有关人体比例的章节中曾提到，由于人体的尺寸因人而异，因此不能当作一种绝对的度量标准。但是，我们可以伸出手臂，接触墙壁来度量一个空间的宽度。同样，如果伸手能触及头上的屋顶，我们也能得出它的高度。一旦我们鞭长莫及做不到这些时，就得依靠视觉而不是触觉线索来得到空间的尺度感。

For these clues, we can use elements that have human meaning and whose dimensions are related to the dimensions of our posture, pace, reach, or grasp. Such elements as a table or chair, the risers and treads of a stairway, the sill of a window, and the lintel over a doorway, not only help us judge the size of a space but also give it a human scale.

为了得到这些线索，我们可以利用那些具有人文意义的要素，这些要素的量度与我们的姿态、步伐、臂展或拥抱等人体量度有关。如一张桌子或一把椅子、楼梯的踢面与踏面、窗台、门上的过梁等，这些要素不仅可以帮助我们判断空间的大小，还可以使空间具有人的尺度。





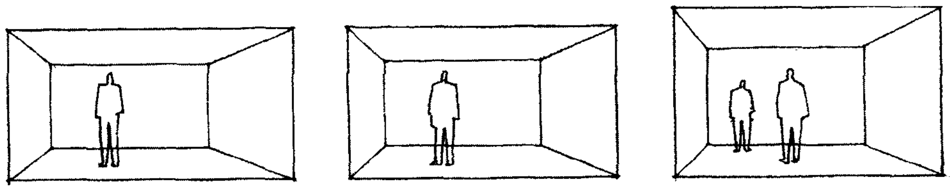


While something that is monumental in scale makes us feel small in comparison, a space that is intimate in scale describes an environment in which we feel comfortable, in control, or important. Intimate settings of tables and lounge chairs in a large hotel lobby tell us something about the expansiveness of the space as well as define comfortable, human-scale areas within it. A stairway leading up to a second-story balcony or loft can give us an idea of the vertical dimension of a room as well as suggest a human presence. A window in a blank wall conveys something about the space behind it and also leaves the impression that it is inhabited.

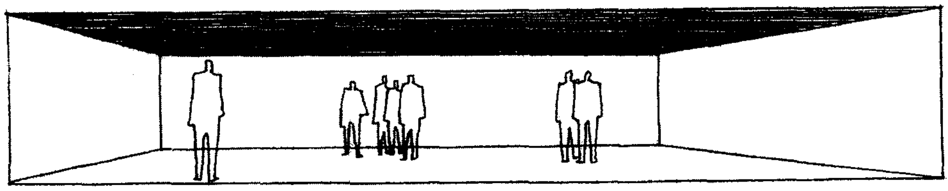
相比之下，具有纪念性尺度的东西使我们感到渺小，而尺度亲切的空间则会形成使我们感到舒适、能够控制或非常重要的氛围。在大型旅馆的休息厅里，将桌子和休息坐椅布置得具有亲近感会使空间具有开阔的感觉，同时在大厅中划分出舒适的、具有人体尺度的区域。通向二层阳台或阁楼的楼梯会让我们领悟房间的垂直量度，并且暗示了人的存在。一堵空白墙上的窗户会使人联想到室内的空间，并产生有人居住的印象。

Of a room's three dimensions, its height has a greater effect on its scale than either its width or length. While the walls of the room provide enclosure, the height of the ceiling plane overhead determines its qualities of shelter and intimacy.

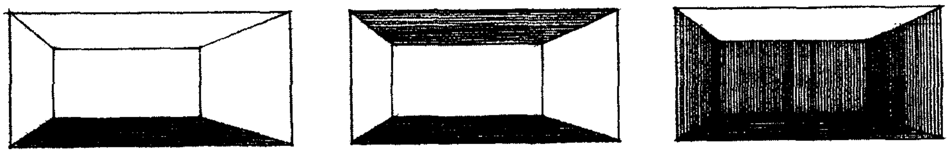
在房间的三个量度中，与长度和宽度相比，高度对房间尺度的影响更大一些。房间的墙壁起着围合的作用，而头上顶棚的高度则决定了房间的保护性与亲切性。



Raising the ceiling height of a 12 X 16-foot room from 8 to 9 feet will be be more noticeable and affect its scale more than if its width were increased to 13 feet or its length to 17 feet. While the 12 X 16-foot room with a 9-foot ceiling might feel comfortable to most people, a 50 X 50 foot space with the same ceiling height would begin to feel oppressive.

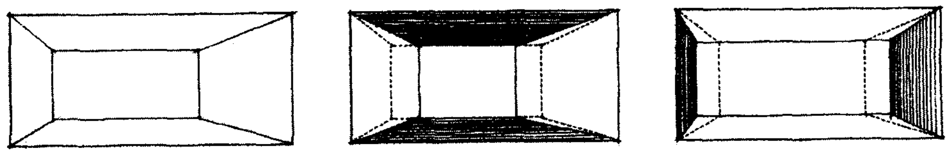


一间12×16英尺的房间，屋顶高度从8英尺抬高到9英尺，比宽度增加到13英尺或长度增加到17英尺所产生的效果更明显，并且对房间尺度的影响要大得多。对于大多数人来说，12×16英尺的房间采用9英尺的净高是令人舒适的，而50×50英尺的空间也用9英尺高的屋顶，就会开始感到压抑。



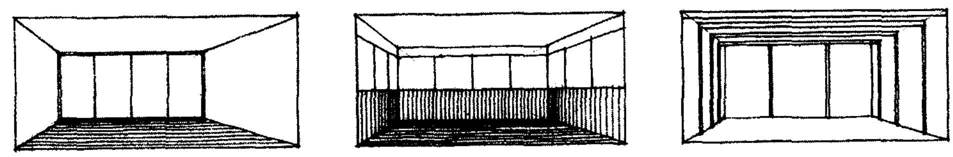
In addition to the vertical dimension of a space, other factors that affect its scale are:

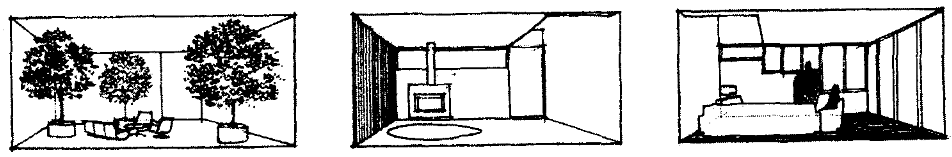
- the shape, color, and pattern of its bounding surfaces
- the shape and disposition of its openings
- the nature and scale of the elements placed within it

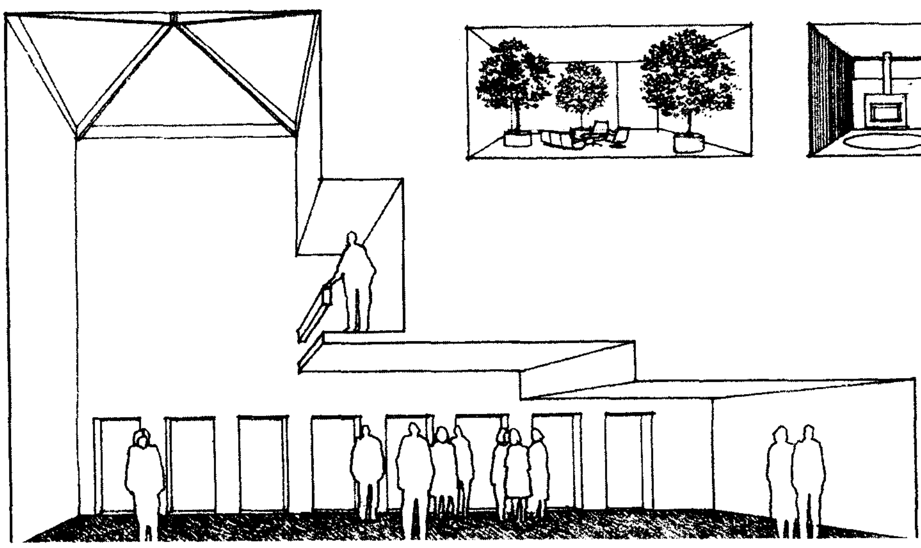


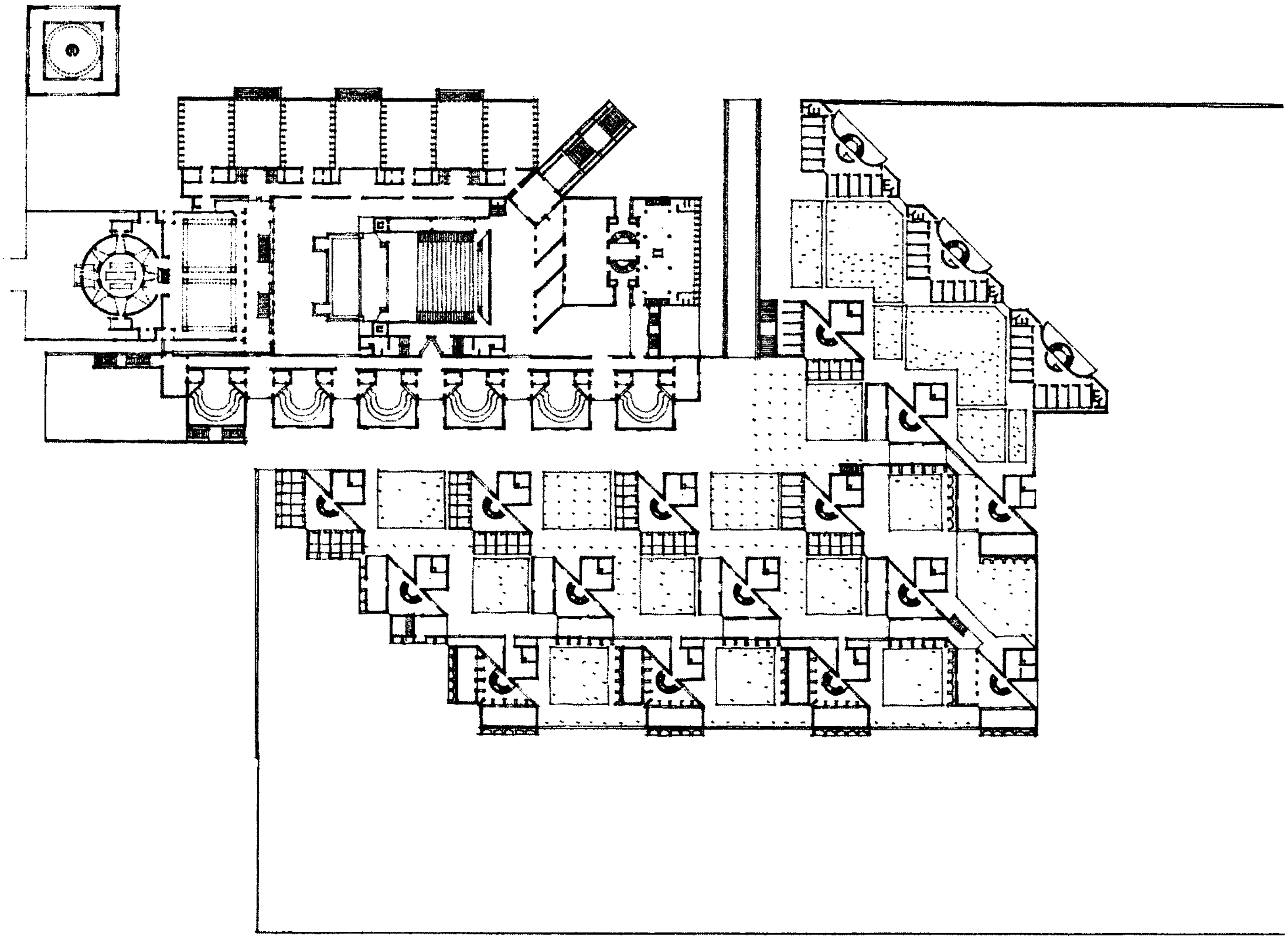
除了空间的垂直量度外，其他影响尺度的要素有：

- 房间表面的形状、色彩和图案
- 门窗开洞的形状和位置
- 房间中物品的尺度和性质









Indian Institute of Management, Ahmedabad, India, 1965, Louis Kahn
印度管理学院，艾哈迈达巴德，印度，1965年， L.康

7 原理
Principles

"... Nothing but confusion can result when order is considered a quality that can equally well be accepted or abandoned, something that can be forgone and replaced by something else. Order must be understood as indispensable to the functioning of any organized system, whether its function be physical or mental. Just as neither an engine nor an orchestra nor a sports team can perform without the integrated cooperation of all its parts, so a work of art or architecture cannot fulfill its function and transmit its message unless it presents an ordered pattern. Order is possible at any level of complexity: in statues as simple as those on Easter Island or as intricate as those by Bernini, in a farmhouse and in a Borromini church. But if there is not order, there is no way of telling what the work is trying to say."

Rudolf Arnheim
The Dynamics of Architectural Form
1977

"……如果秩序被认为是一种接受或放弃两可的性质，是可以抛弃由他物取而代之的东西，那么只能产生混乱。在履行任何组合系统的功能的时候，无论其功能是物质的还是精神的，秩序必须被认为是不可缺少的。如果没有了各个组成部分的整体协作，则引擎难以工作，管弦乐队难以演奏，运动队难以比赛；一件艺术作品或建筑作品如果不能呈现出有秩序的图案，就难于履行其功能，难以传达其信息。无论在何种复杂程度上，秩序都是可以做到的：无论是复活节岛上的简单雕像，还是伯尼尼所作的复杂雕塑，抑或一栋农舍、一座博洛米尼教堂。然而，如果没有秩序，就无法表达作品要说明什么。"

R. 阿恩海姆
《建筑形式的动力》
1977年

While Chapter 4 employed a geometric basis for organizing the forms and spaces of a building, this chapter discusses additional principles that can be utilized to create order in an architectural composition. Order refers not simply to geometric regularity, but rather to a condition in which each part of a whole is properly disposed with reference to other parts and to its purpose so as to produce a harmonious arrangement.

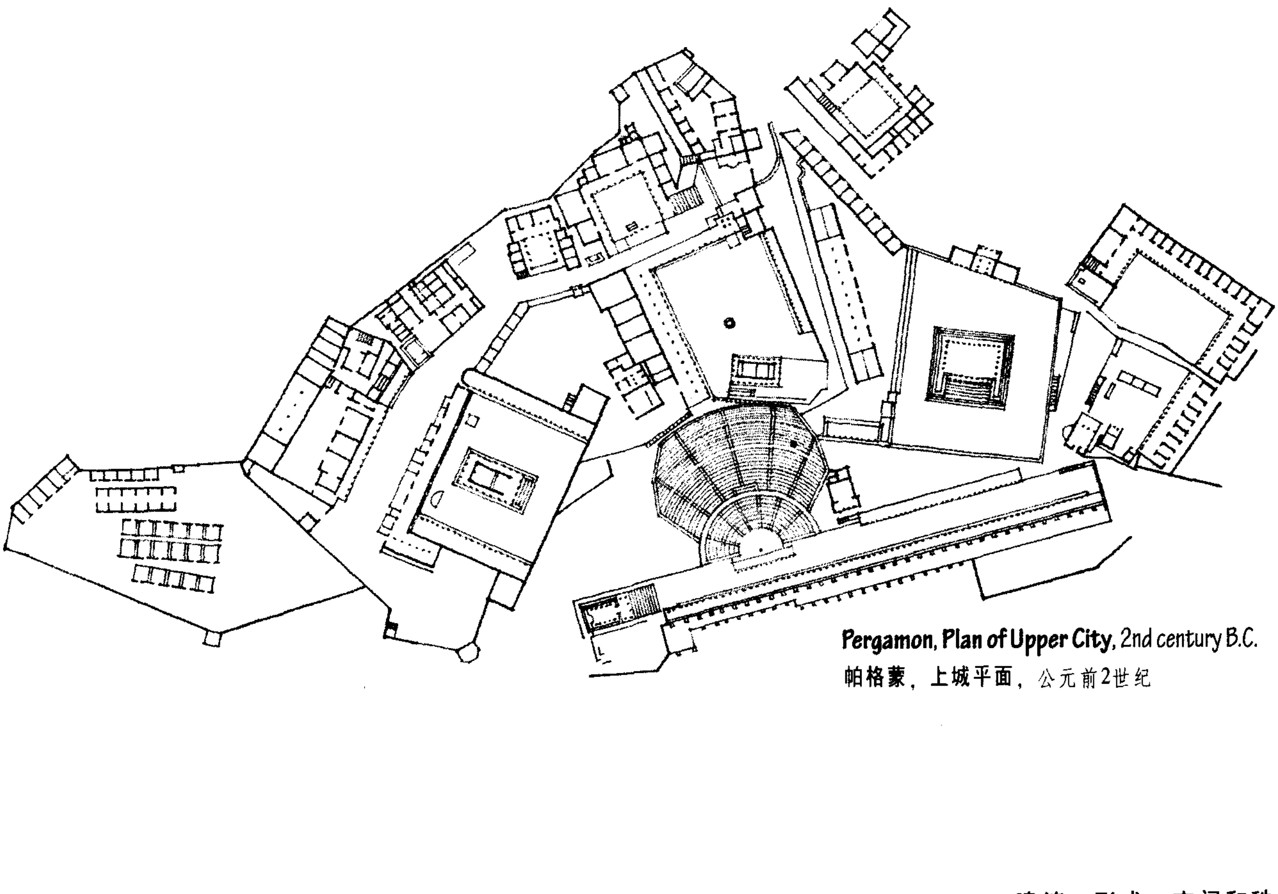
本书的第4章，以几何图形为基础，阐述建筑形式与空间的组合，本章还讨论另外一些原理，运用这些原理可在建筑构图中产生一种秩序。秩序不单单是指几何规律性，而是指一种状态，即整体之中的每个部分与其他部分的关系，以及每个部分所要表达的意图都处理得当，直至产生一个和谐的结果。

There exists a natural diversity and complexity in the program requirements for buildings. The forms and spaces of any building should acknowledge the hierarchy inherent in the functions they accommodate, the users they serve, the purposes or meaning they convey, and the scope or context they address. It is in recognition of this natural diversity, complexity, and hierarchy in the programming, designing, and making of buildings that ordering principles are discussed.

建筑设计纲要的要求中，必然存在着多样性和复杂性。任何建筑物的形式与空间都应该考虑到：建筑物功能所固有的等级、建筑物服务的对象、建筑物所要传达的目的和含义，以及建筑物所在地的周围环境。正是因为认识到建筑规划、建筑设计和建筑施建过程中必然存在多样性、复杂性和等级性，所以本章才对秩序原理加以讨论。

Order without diversity can result in monotony or boredom; diversity without order can produce chaos. A sense of unity with variety is the ideal. The following ordering principles are seen as visual devices that allow the varied and diverse forms and spaces of a building to coexist perceptually and conceptually within an ordered, unified, and harmonious whole.

有秩序而无变化，结果是单调和令人厌倦；有变化而无秩序，结果则是杂乱无章。统一之中富于变化是一种理想的境界。下面的秩序原理可以看作视觉手段，它们能使一栋建筑物中各种各样的形式和空间在感性上和概念上共存于一个有秩序的、统一的、和谐的整体之中。



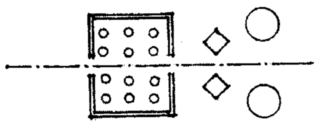
Pergamon, Plan of Upper City, 2nd century B.C.
帕格蒙，上城平面，公元前2世纪

Axis
轴线

A line established by two points in space, about which forms and spaces can be arranged in a symmetrical or balanced manner.

它是由空间中两点连成的线，形式和空间可以关于此线呈对称或平衡的方式排列。

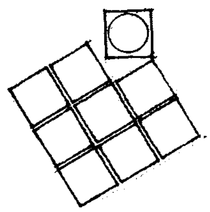
Symmetry
对称



The balanced distribution and arrangement of equivalent forms and spaces on opposite sides of a dividing line or plane, or about a center or axis.

一条分界线或一个分界面的两侧，或者围绕一个圆心或轴线，均衡地分布等同的形式和空间。

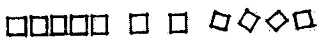
Hierarchy
等级



The articulation of the importance or significance of a form or space by its size, shape, or placement relative to the other forms and spaces of the organization.

通过尺寸、形状或位置与组合中其他形式或空间的对比来表明某个形式和空间的重要性或特殊意义。

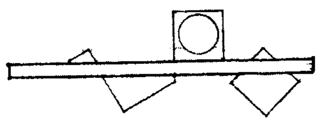
Rhythm
韵律



A unifying movement characterized by a patterned repetition or alternation of formal elements or motifs in the same or a modified form.

它是一种统一的运动，其特点是在同一个形式或者某一变化的形式中，形式要素或主题图案重复或交替出现。

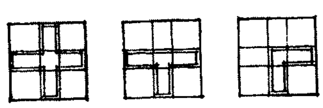
Datum
基准



A line, plane, or volume that, by its continuity and regularity, serves to gather, measure, and organize a pattern of forms and spaces.

利用线、面或体的连续性与规则性，来聚集、衡量以及组织形式与空间的图案。

Transformation
变换



The principle that an architectural concept, structure, or organization can be altered through a series of discrete manipulations and permutations in response to a specific context or set of conditions without a loss of identity or concept.

通过一系列个别的处理和转变，可以改变建筑观念、建筑结构或建筑组合的原则，其目的在于呼应特殊的环境或基地条件，而不失其可识别性和基本概念。



This Florentine street flanked by the **Uffizi Palace** links the River Arno to the Piazza della Signoria.
这条佛罗伦萨的街道两侧是**乌飞齐宫**，将亚诺河与西尼奥里亚广场连接起来。

The axis is perhaps the most elementary means of organizing forms and spaces in architecture. It is a line established by two points in space, about which forms and spaces can be arranged in a regular or irregular manner. Although imaginary and not visible except to the mind's eye, an axis can be a powerful, dominating, regulating device. Although it implies symmetry, it demands balance. The specific disposition of elements about an axis will determine whether the visual force of an axial organization is subtle or overpowering, loosely structured or formal, picturesque or monotonous.

轴线也许是建筑形式与空间组合中最基本的方法。它是由空间中的两点连成的一条线。以此线为轴，可采用规则或不规则的方式布置形式与空间。虽然是想象的，并且除了心灵中的“眼睛”外，不能真正看到，但轴线却是强有力的支配与控制手段。虽然轴线暗示着对称，但它需要的是均衡。各要素围绕轴线的具体位置，将在视觉上决定轴线组合的力量是模糊不定还是压倒一切，是结构松散还是有条有理，是生动活泼或是单调乏味。



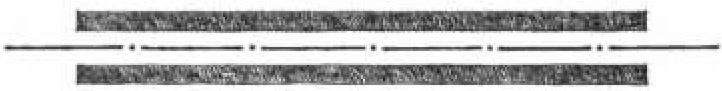
Since an axis is essentially a linear condition, it has qualities of length and direction, and induces movement and promotes views along its path.

由于轴线本质上是线式状态，因此它具有长度和方向性，并沿着它的路径，引导运动，展示景观。



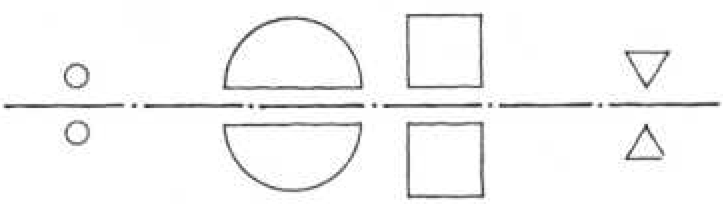
For its definition, an axis must be terminated at both of its ends by a significant form or space.

为了明确界定轴线，它的两个结束端都必须是重要的形式或空间。



The notion of an axis can be reinforced by defining edges along its length. These edges can be simply lines on the ground plane, or vertical planes that define a linear space coincident with the axis.

可以沿着轴线的长度限定两条边缘来加强轴线的意向。两条边缘可以是地面上的简单线条，也可以是沿轴向界定出的线式空间的垂直面。



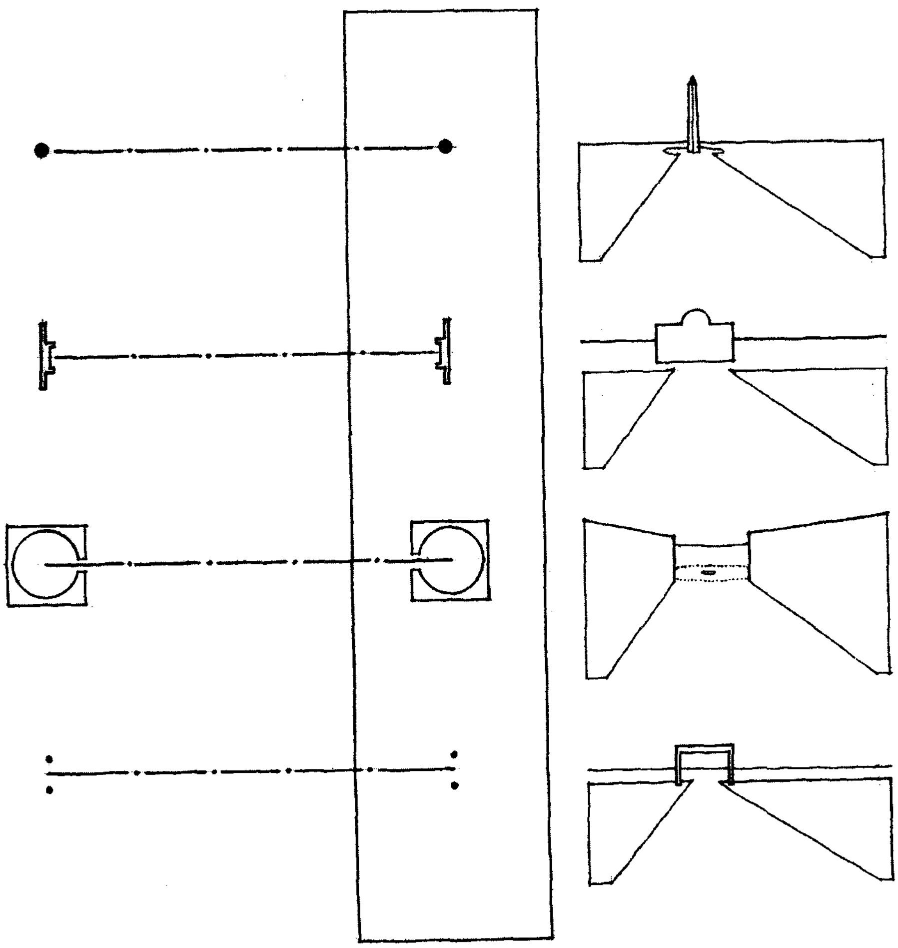
An axis can also be established simply by a symmetrical arrangement of forms and spaces.

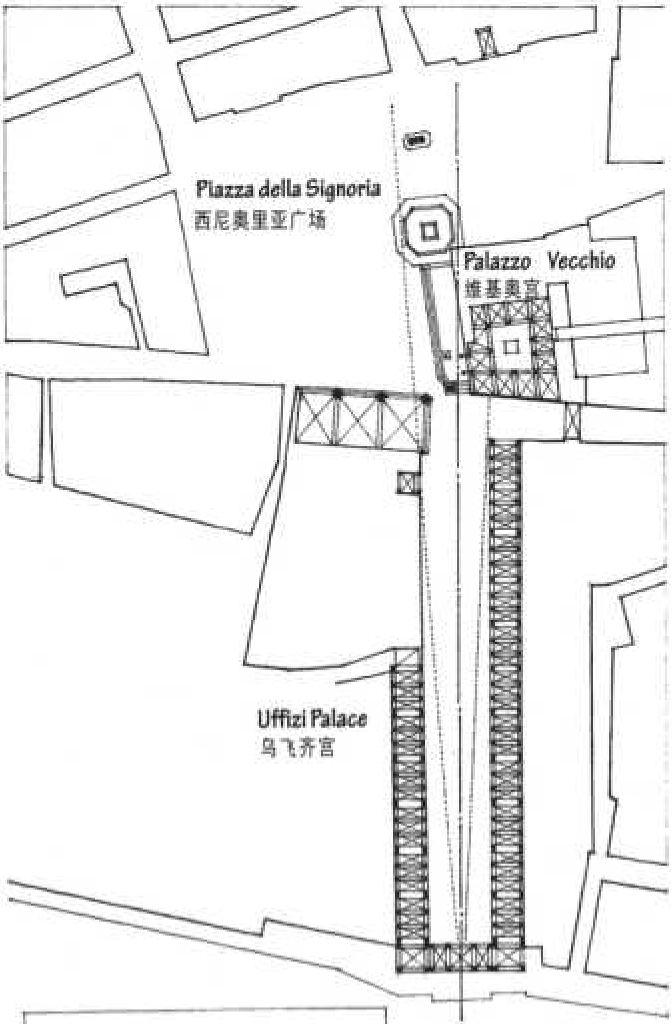
轴线也可以简单地由对称布置的形式和空间来构成。

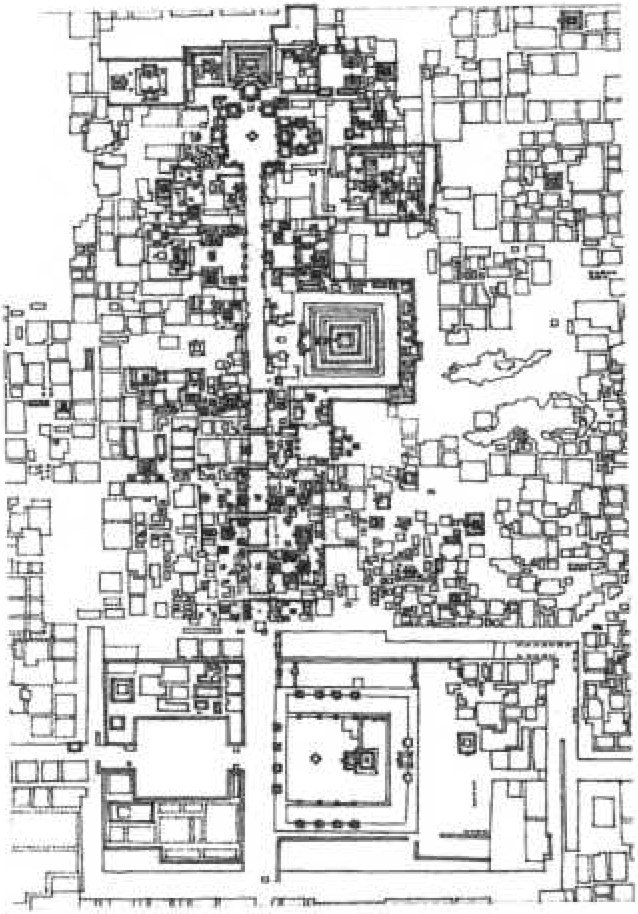
The terminating elements of an axis serve to both send and receive its visual thrust. These culminating elements can be any of the following:

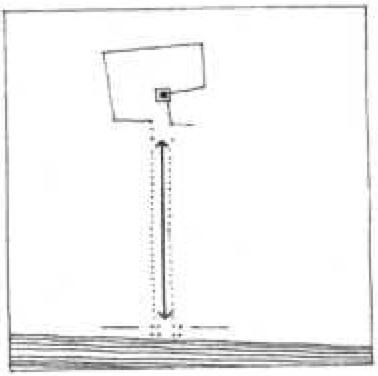
一条轴线的终止要素，可作为视觉延伸的出发点或者接受点。这些终止要素可以是下列任何一种：

- points in space established by vertical, linear elements or centralized building forms
  由垂直的、线式的要素或集中的建筑形式在空间中形成的点
- vertical planes, such as symmetrical building facades or fronts, preceded by a forecourt or similar open space
  垂直面，例如对称的建筑立面或正面，前面有前院或类似的开敞空间
- well-defined spaces, generally centralized or regular in form
  界限分明的空间，通常是集中的或规则的形式
- gateways that open outward toward a view or vista beyond
  视野深远、向外开敞的门道



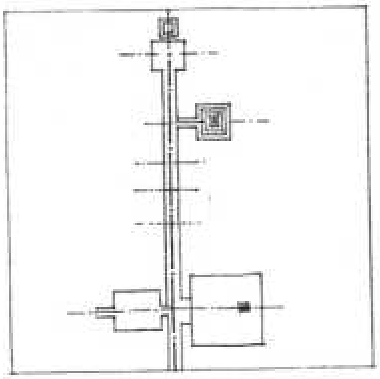






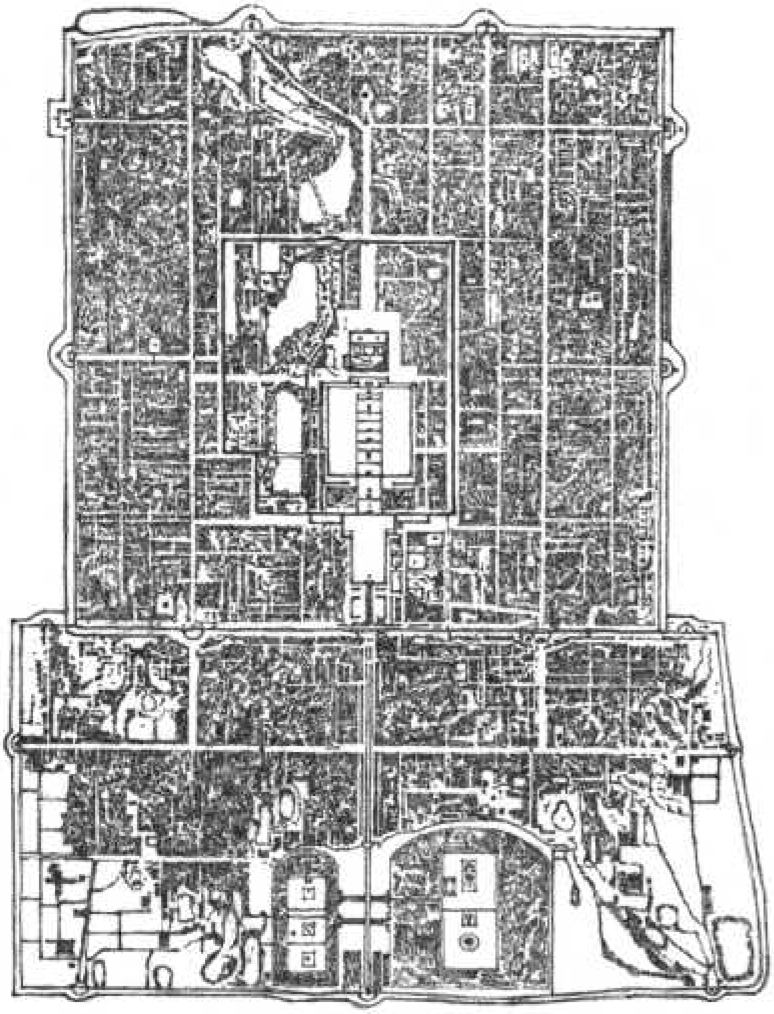
The wings of the **Uffizi Palace** in Florence, Italy, (1560, *Giorgio Vasari*) frame an axial space which leads from the River Arno, through the Uffizi arch, to the Piazza della Signoria and the **Palazzo Vecchio** (1298–1314, *Arnolfo di Cambio*).

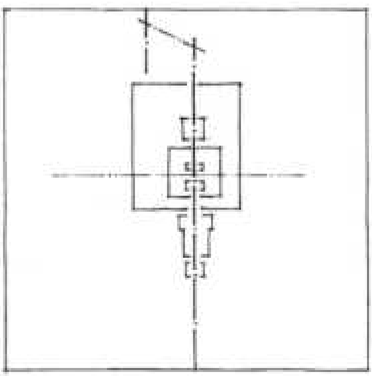
意大利佛罗伦萨的**乌飞齐宫**（1560年， G.瓦萨里）从亚诺河穿过乌飞齐拱门，两侧形成一个轴向空间框，到达西尼奥里亚广场和**维基奥宫**（1298年—1314年， A.卡姆比奥）。



Teotihuacan, City of the Gods. Located near Mexico city, Teotihuacan was the largest and most influential ritual center of Mesoamerica, founded c. 100 B.C. and flourishing until about A.D. 750. The site was dominated by two massive temple-pyramids, the Pyramid of the Sun and the smaller Pyramid of the Moon, from which the Avenue of the Dead runs south to the citadel and market compound in the center of the city.

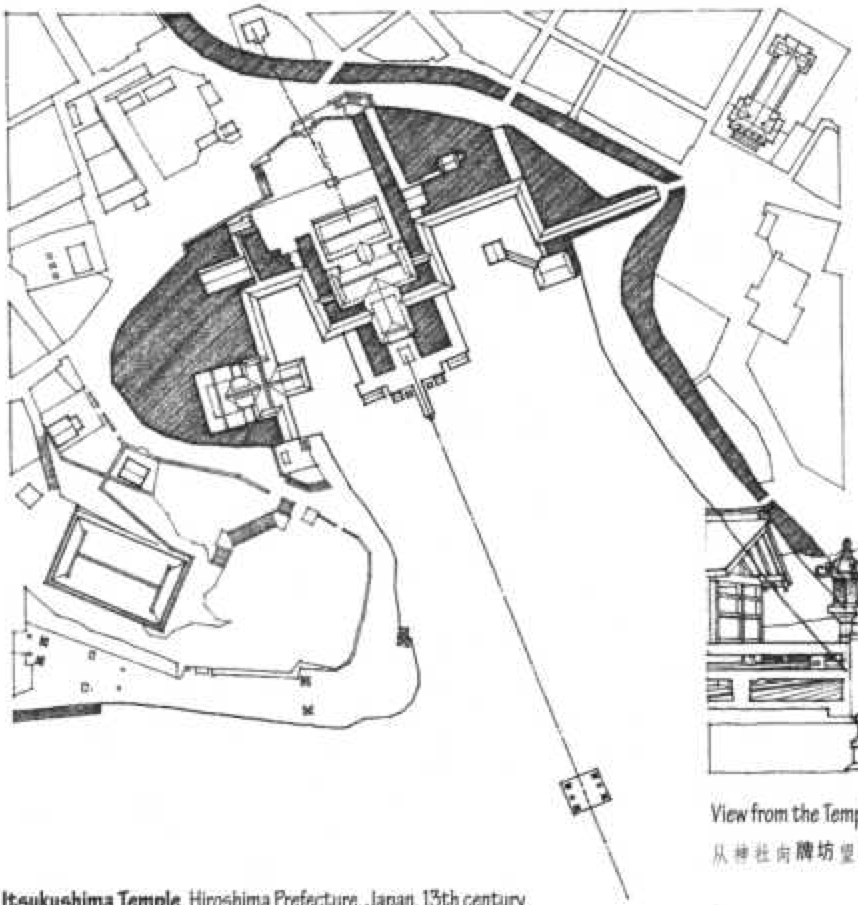
狄奥提瓦干，上帝之城。狄奥提瓦干位于墨西哥城附近，是中美洲最大的、最有影响力的宗教仪式中心，建于公元前100年，直到750年一直都非常繁盛。两座宏伟巨大的金字塔形庙宇，即太阳金字塔和稍小一点的月亮金字塔，在基地中居于主导地位。死亡大道从这里一直向南通向城市中心的城堡和市场。



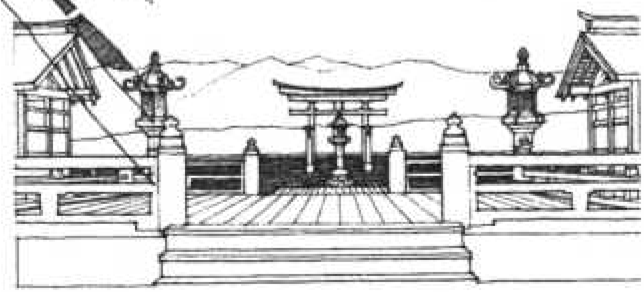


Plan of Peking (Beijing), China. Located on its north-south axis is the Forbidden City, a walled section within the inner city, built in the 15th century and containing the Imperial Palace and other buildings of the imperial government of China. It was so named because it was formerly closed to the public.

北京城平面，中国。坐落在南北向中轴线上的紫禁城是内城中用围墙围起的部分，建于15世纪，包括皇宫和中国帝王政府的其他建筑。它之所以如此命名，是因为这里从前不对公众开放。



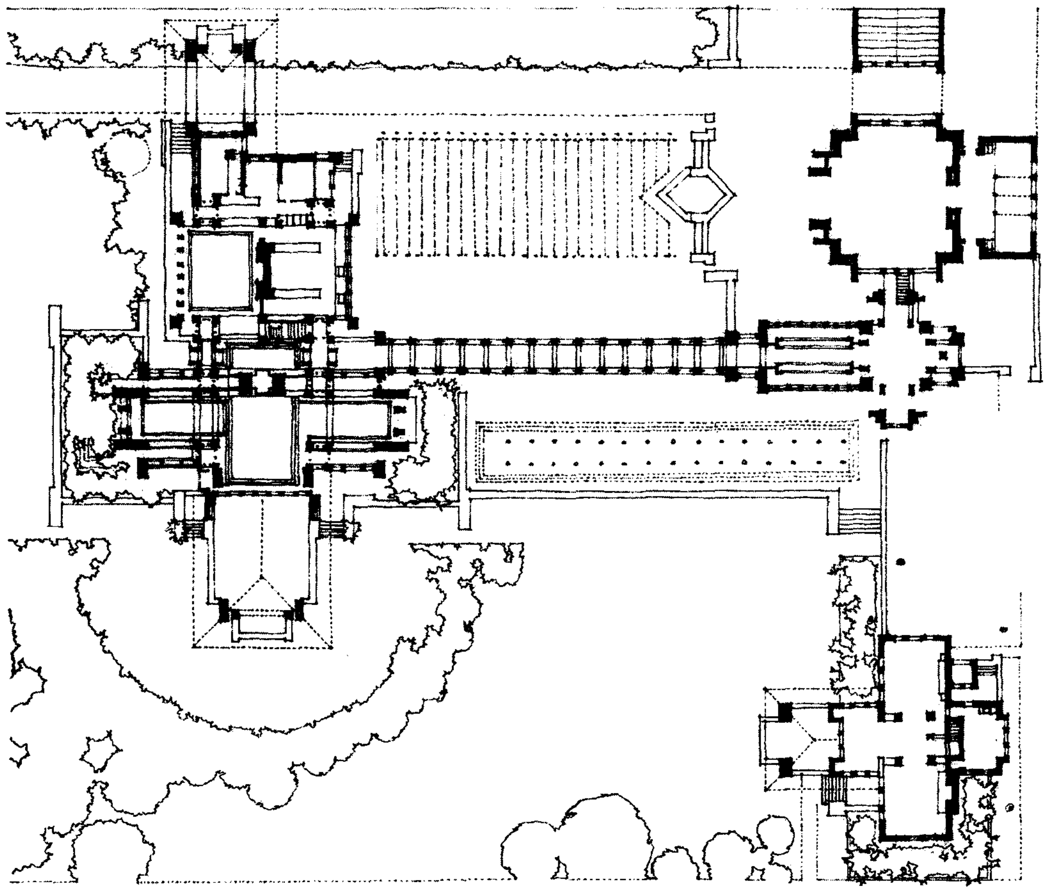
Itsukushima Temple, Hiroshima Prefecture, Japan, 13th century
严岛神社，广岛县，日本，13世纪



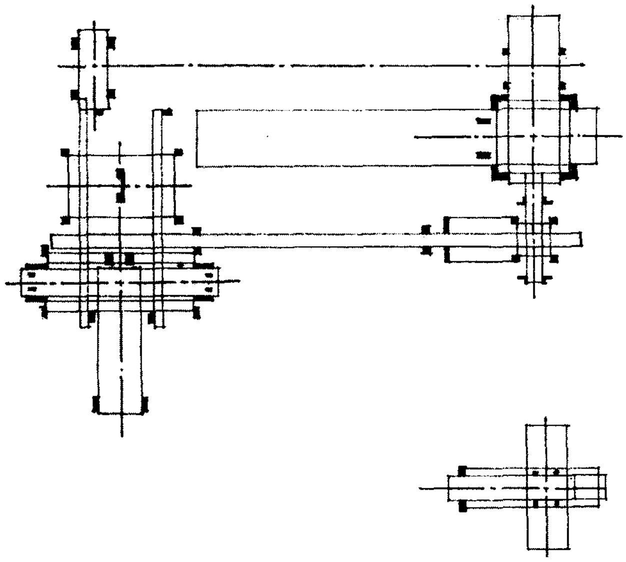
View from the Temple toward the **Torii**, a symbolic gateway in the sea.
从神社向**牌坊**望去，是海上象征性的门道。

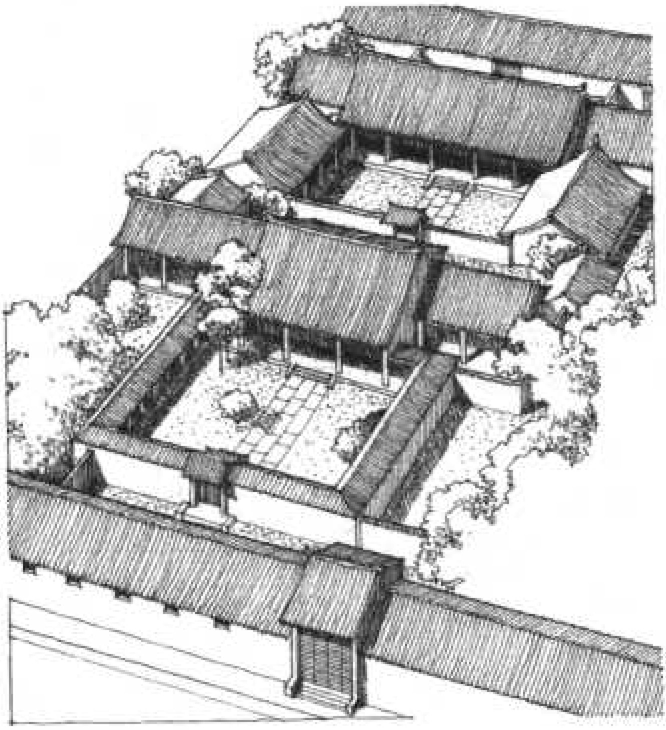
Torii is a monumental, freestanding gateway on the approach to a Shinto shrine, consisting of two pillars connected at the top by a horizontal crosspiece and a lintel above it, usually curving upward.

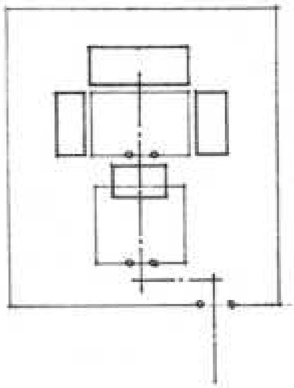
牌坊是通向神道教庙宇的大门，具有纪念性的、独立的特点，由两根柱子构成。两柱的顶部以水平横梁相连，横梁之上有一根过梁，通常向上弯曲。



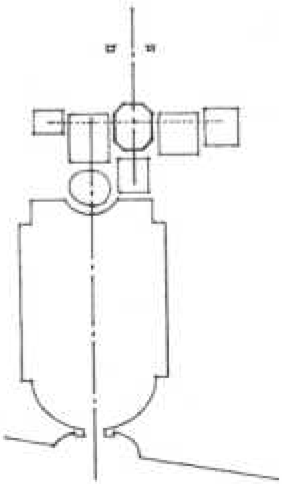
Darwin D. Martin House and Estate, Buffalo, New York, 1904, Frank Lloyd Wright
达尔文·D. 马丁住宅与地产，布法罗，纽约州，1904年，F. L. 莱特



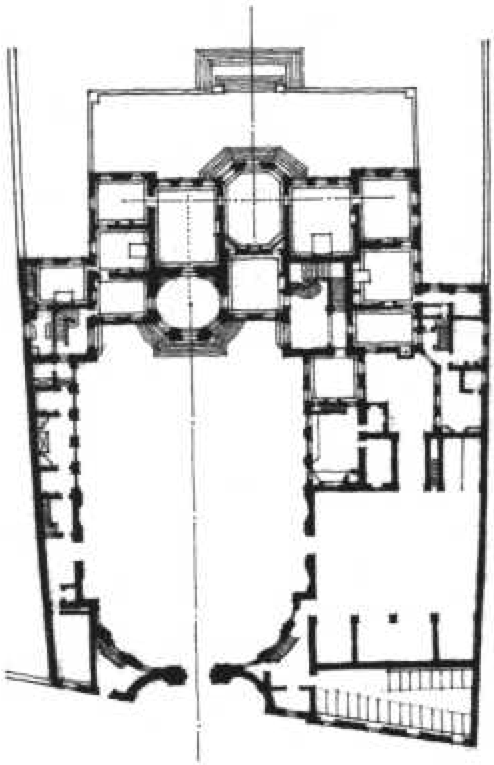


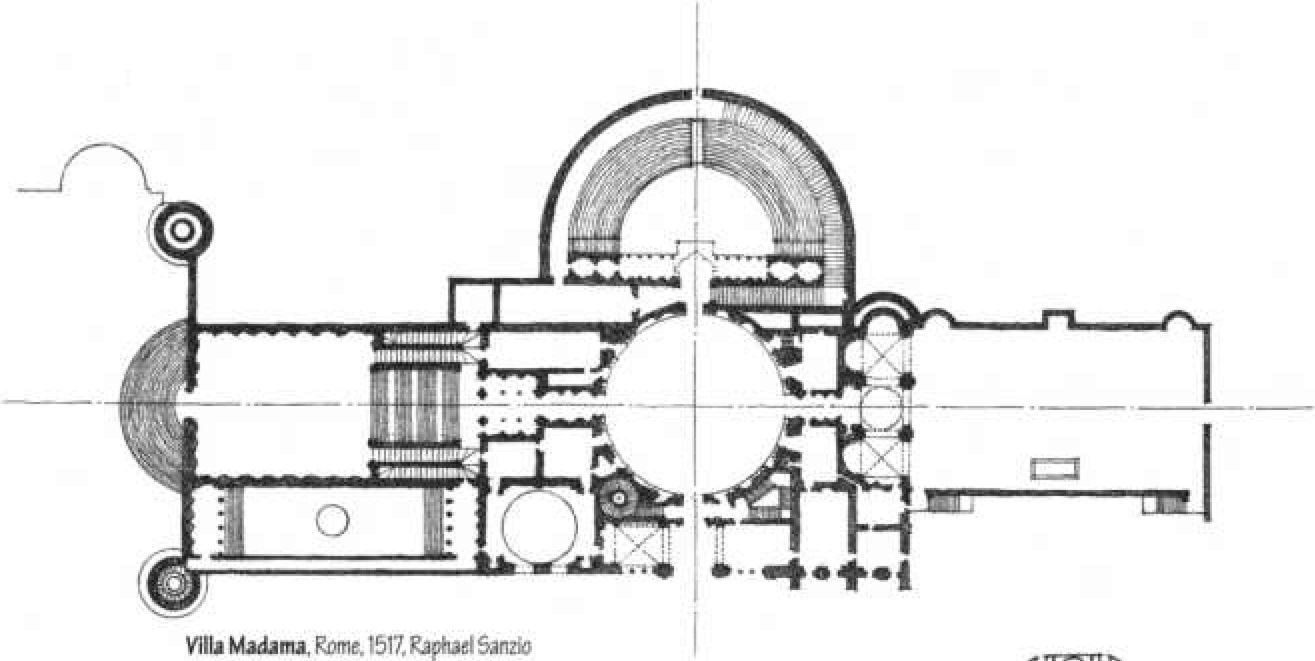


Chinese Courtyard House, Peking (Beijing), China
中国的四合院式住宅，北京，中国

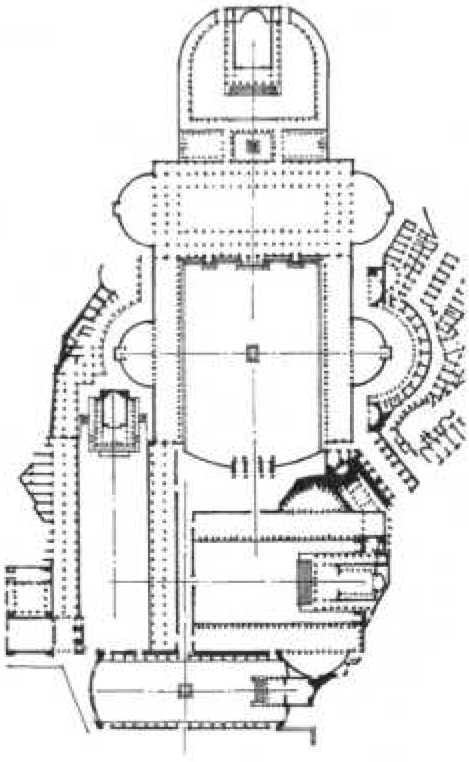


Hôtel de Matignon, Paris, 1721, J. Courtonne
马蒂诺饭店，巴黎，1721年，J.柯顿纳

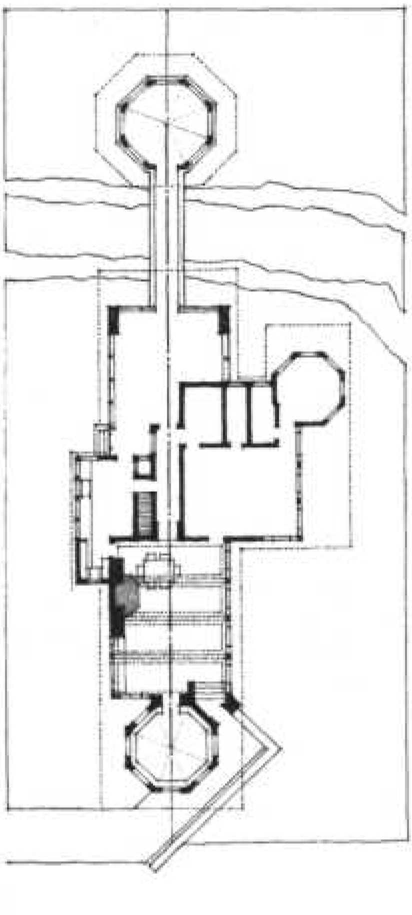




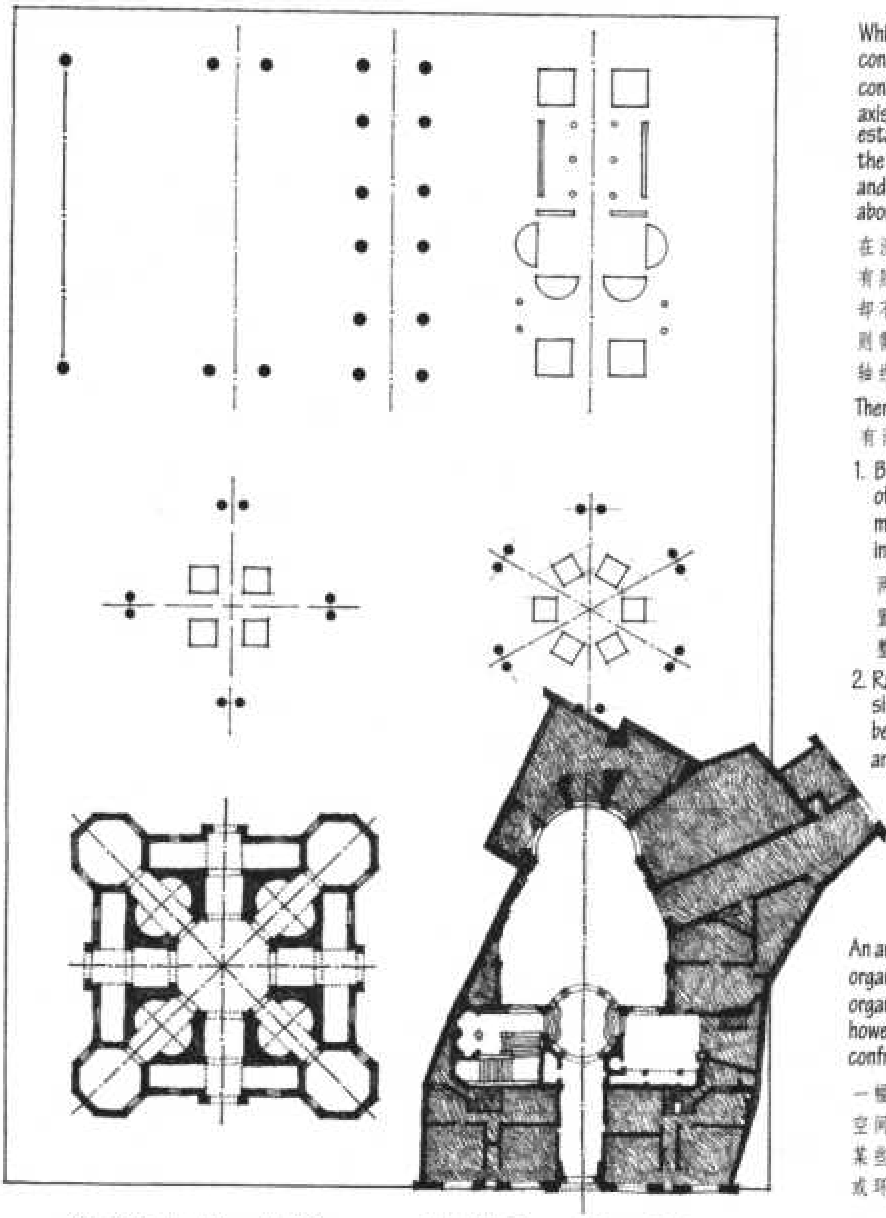
Villa Madama, Rome, 1517, Raphael Sanzio
马德莫别墅，罗马，1517年，R.桑吉奥



The Imperial Forums of Trajan, Augustus, Caesar, and Nerva, Rome, 1st century B.C. to 2nd century A.D.
图拉真、奥古斯都、凯撒及纳瓦广场，罗马，公元前1世纪至公元2世纪



W.A. Glasner House, Glencoe, Illinois, 1905, Frank Lloyd Wright
W. A. 格拉森纳住宅，格林科，伊利诺斯州，1905年，F. L. 莱特



Plan of an Ideal Church, 1460, Antonio Filarete
理想教堂的平面，1460年，A. 费拉特

Hôtel de Beauvais, Paris, 1656, Antoine Le Pautre
波维斯饭店，巴黎，1656年，A. 波特烈

While an axial condition can exist without a symmetrical condition being simultaneously present, a symmetrical condition cannot exist without implying the existence of an axis or center about which it is structured. An axis is established by two points; a symmetrical condition requires the balanced arrangement of equivalent patterns of form and space on opposite sides of a dividing line or plane, or about a center or axis.

在没有对称同时出现的情况下可以存在轴线，而没有隐含的轴线或中心来组织对称图形建构时，对称却不可能存在。两点形成一条轴线；而对称的状态则需要在分界线或分界面的两侧，或者围绕中心或轴线，均衡地布置相同的形式与空间图案。

There are two fundamental types of symmetry:
有两种基本类型的对称：

1. Bilateral symmetry refers to the balanced arrangement of similar or equivalent elements on opposite sides of a median axis so that only one plane can divide the whole into essentially identical halves.

   两侧对称式是指在一条中轴线的两侧，均衡地布置相似或相同的要素。这样一来只有一个面把整体分成完全相同的两半。

2. Radial symmetry refers to the balanced arrangement of similar, radiating elements such that the composition can be divided into similar halves by passing a plane at any angle around a centerpoint or along a central axis.

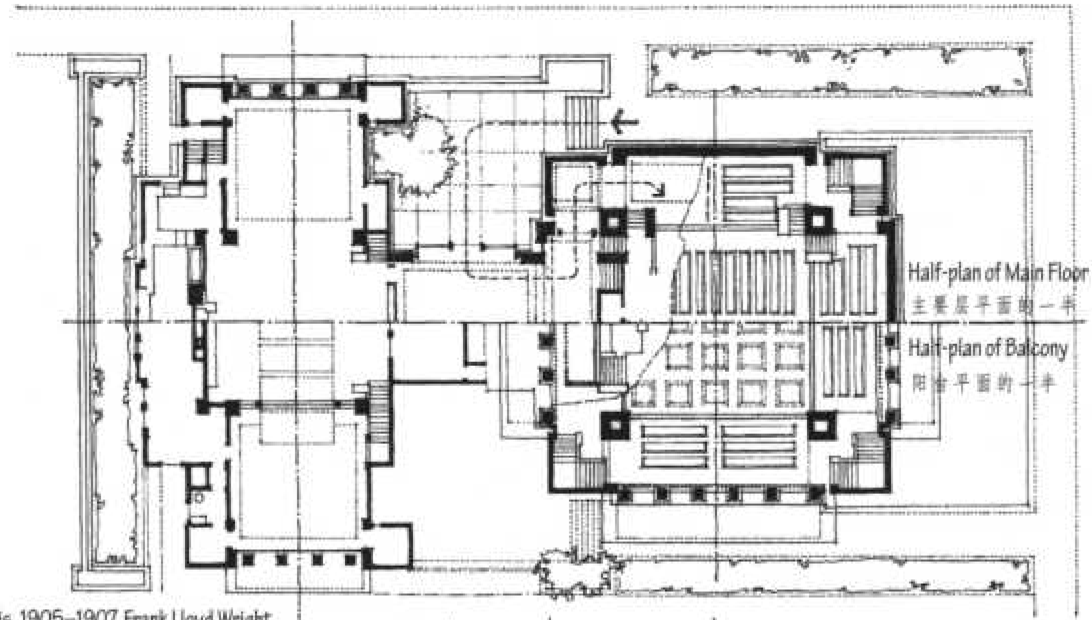
   放射式对称是指均衡地布置相似的、放射状的要素。这样一来，围绕一个中心或沿着一条中心轴把分割面旋转到任意角度，都可以把整个构图分成相似的两半。

An architectural composition can utilize symmetry to organize its forms and spaces in two ways. An entire building organization can be made symmetrical. At some point, however, any totally symmetrical arrangement must confront and resolve the asymmetry of its site or context.

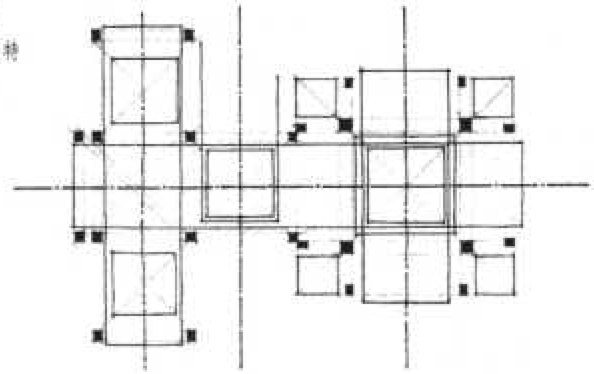
一幅建筑构图可以两种方式来利用对称组合形式与空间。整个建筑物的组合可以是对称的。然而，在某些情况下任何完全对称的布局都必须面临其基地或环境不对称的状态，并解决这一问题。

A symmetrical condition can occur in only a portion of the building and organize an irregular pattern of forms and spaces about itself. The latter case of local symmetry allows a building to respond to exceptional conditions of its site or program. The symmetrical condition itself can be reserved for significant or important spaces within the organization.

对称的情况可能只发生在建筑物的局部，同时围绕对称部分来组合不规则的形式与空间图案。后一种局部对称的情形可以使建筑物适应场地或建筑设计纲要的特殊条件。对称状态本身可以用于建筑组合之中有特殊意义的或非常重要的空间。

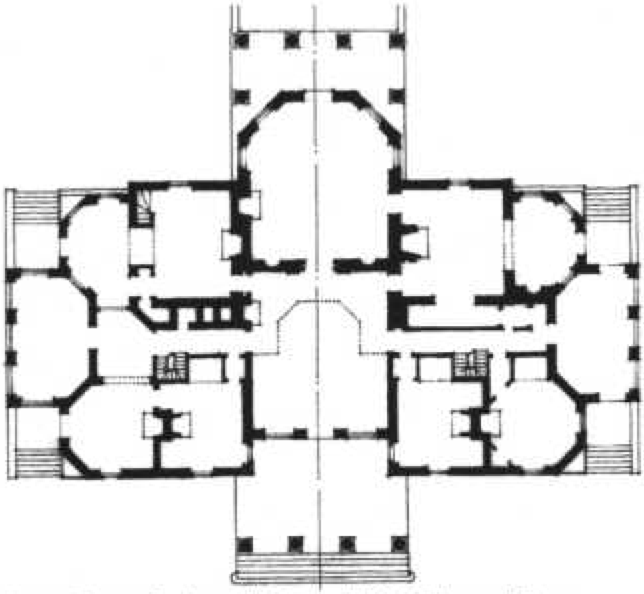


Unity Temple, *Oak Park, Illinois, 1905–1907, Frank Lloyd Wright*
协和教堂，橡树公园，伊利诺斯州，1905年—1907年，F. L. 莱特

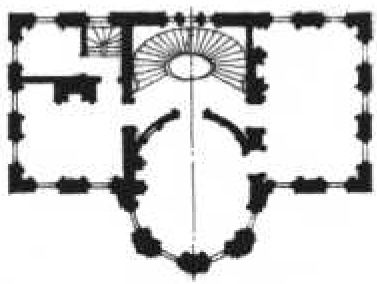


The regularity of form or arrangement in terms of like, reciprocal, or corresponding parts.

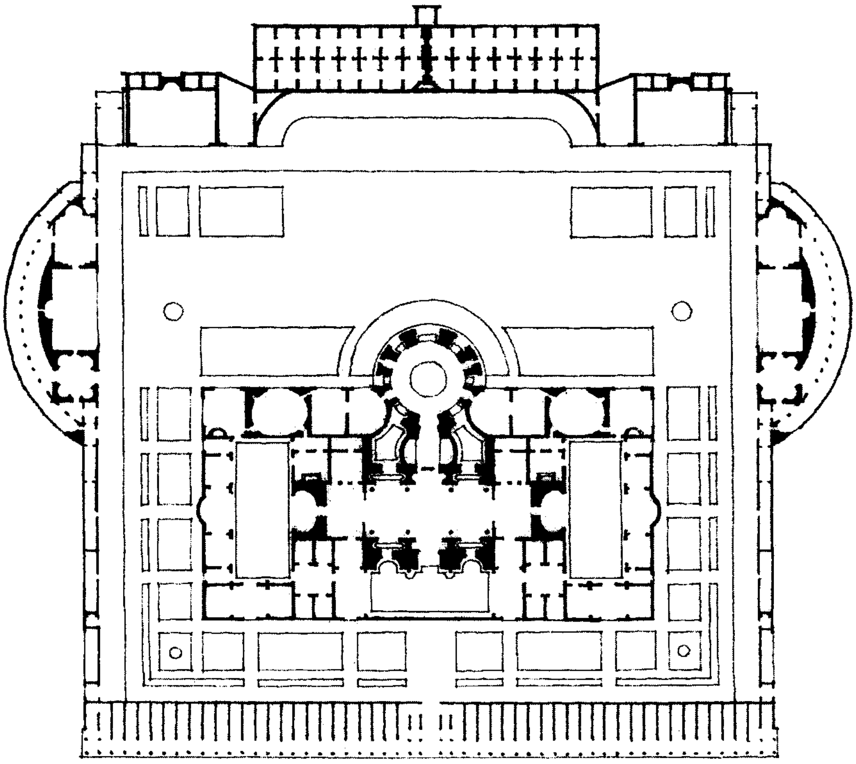
形式的规整性，或者说以相似、互补或对应部位为根据的布局。



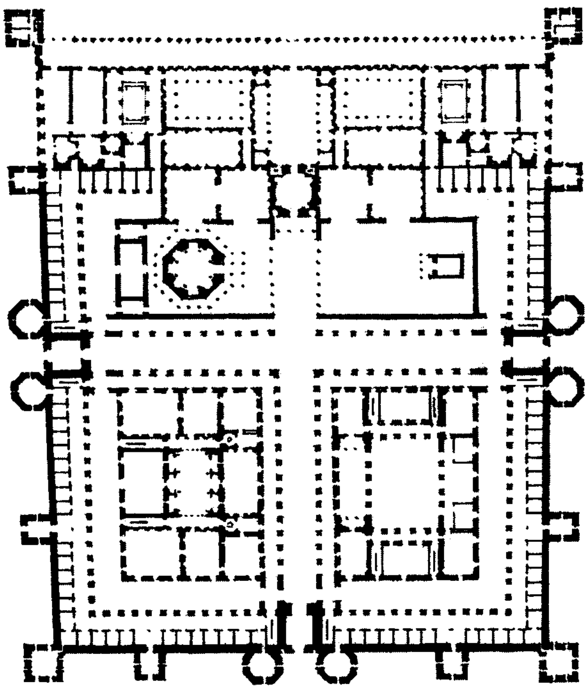
Monticello, *near Charlottesville, Virginia, 1770-1808, Thomas Jefferson*
蒙蒂塞洛，夏洛茨维尔附近，弗吉尼亚州，1770年—1808年，T. 杰斐逊



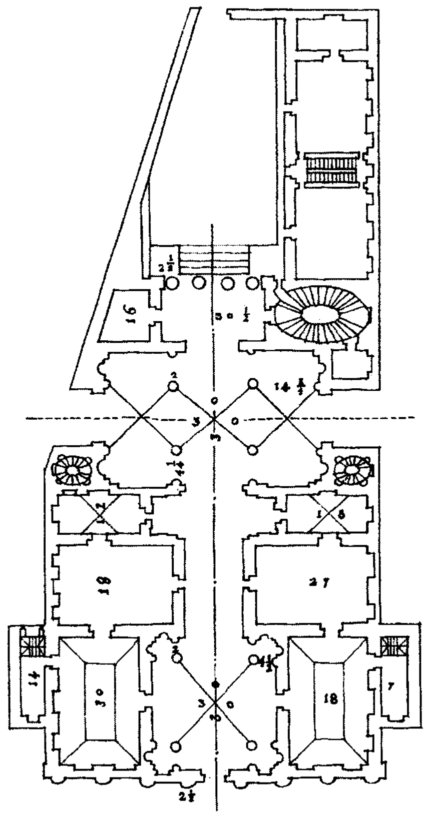
Nathaniel Russell House, *Charleston, South Carolina, 1809*
N. 拉塞尔住宅，查尔斯顿，南卡罗来纳州，1809年



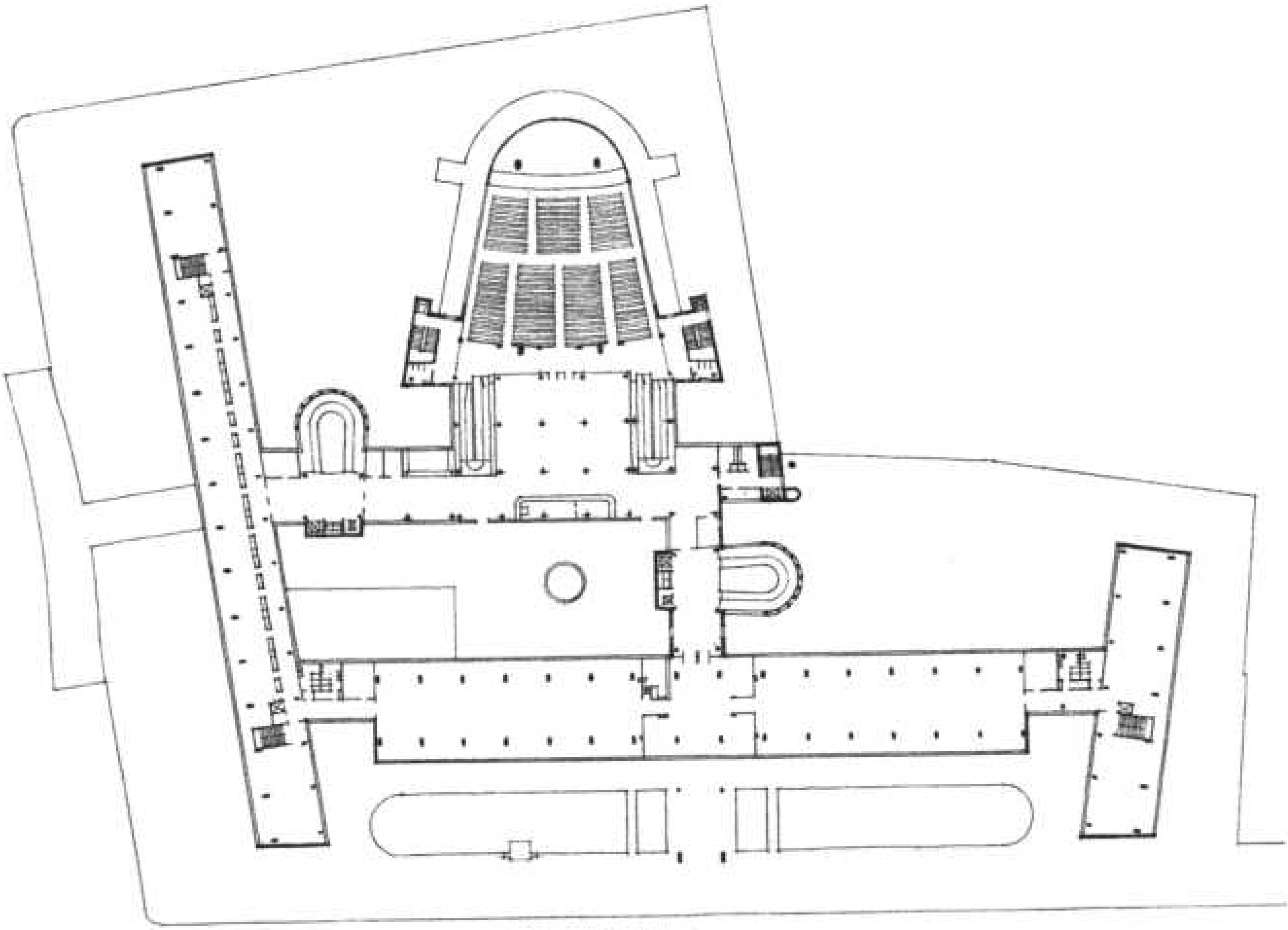
Baths (Thermae) of Caracalla, Rome, A.D. 211-217
卡拉卡拉浴场，罗马，211年—217年



Palace of Diocletian, Spalato, Yugoslavia, c. A.D. 300
狄奥克列顿宫，斯巴拉多，南斯拉夫，300年

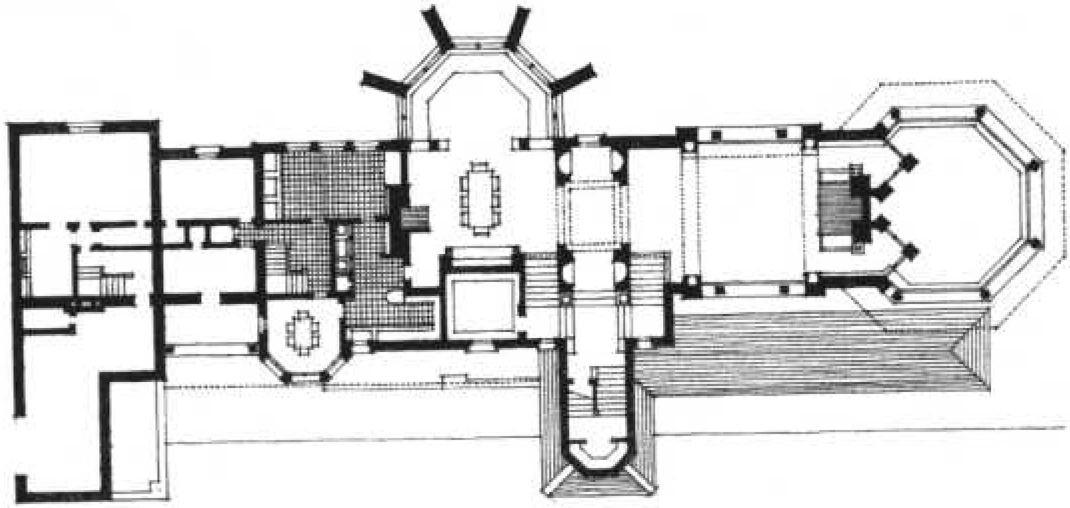


Palazzo No. 52, Andrea Palladio
52号府邸，A. 帕拉蒂奥



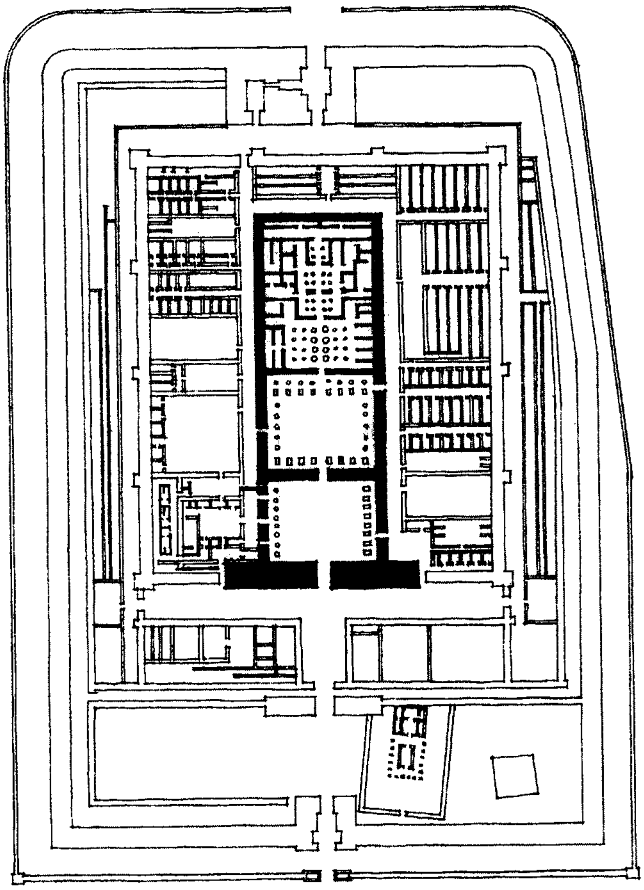
Third Floor Plan, Centrosoyus Building, Kirova Ulitsa, Moscow, 1929–1933, Le Corbusier

三层平面，合作总社大厦，基洛夫大街，莫斯科，1929年—1933年，勒·柯布西埃

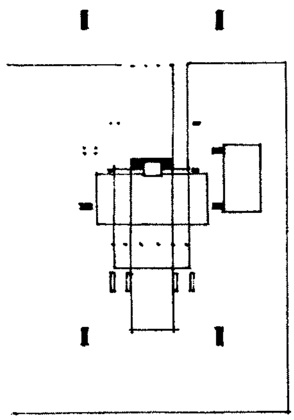


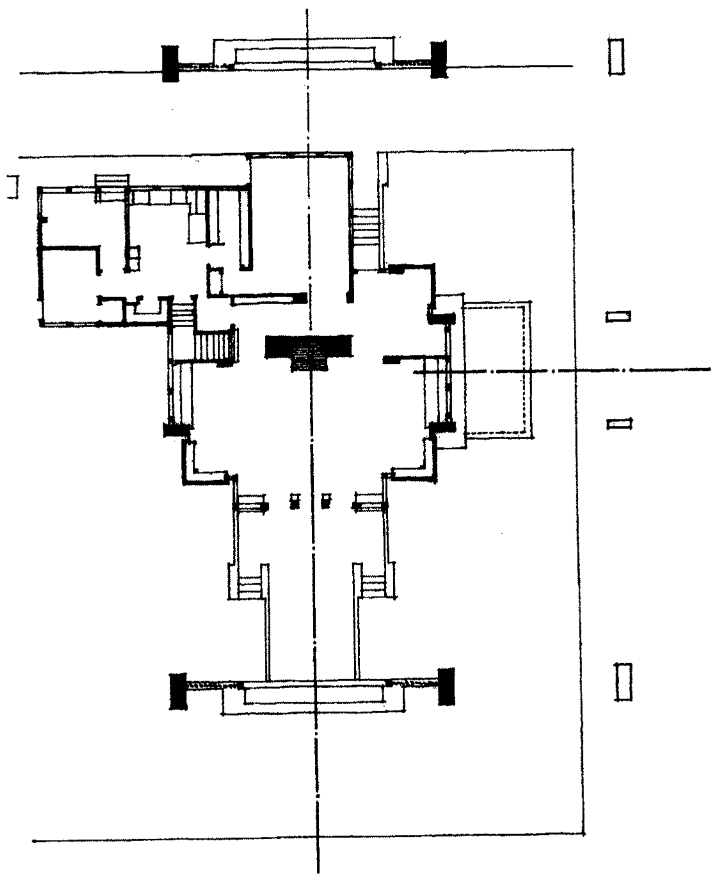
Husser House, Chicago, Illinois, 1899, Frank Lloyd Wright

哈塞尔住宅，芝加哥，伊利诺斯州，1899年，F. L. 赖特

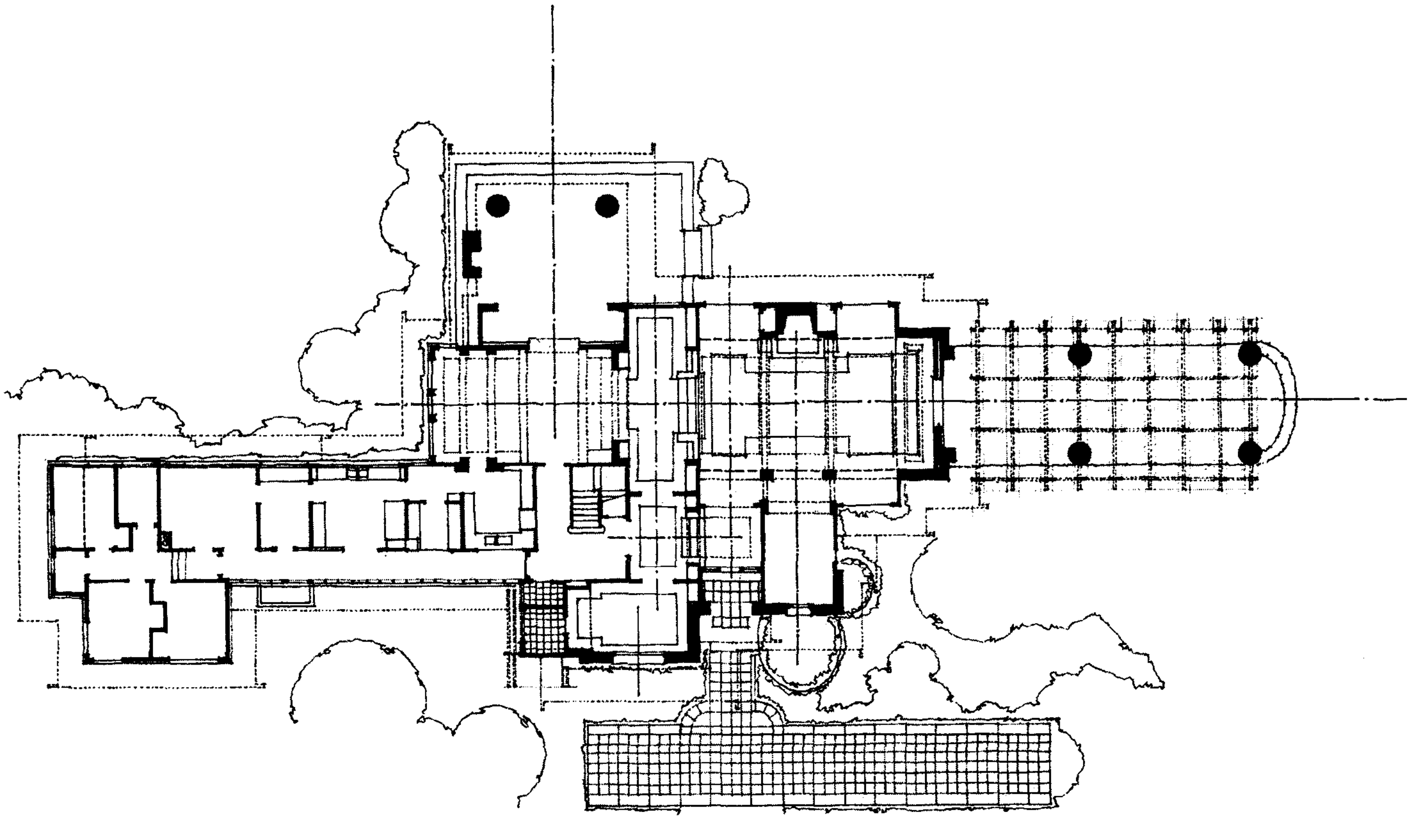


Mortuary Temple of Rameses III, Medînet-Habu, 1198 B.C.
拉美西斯三世灵殿，梅迪纳特—哈布，公元前1198年



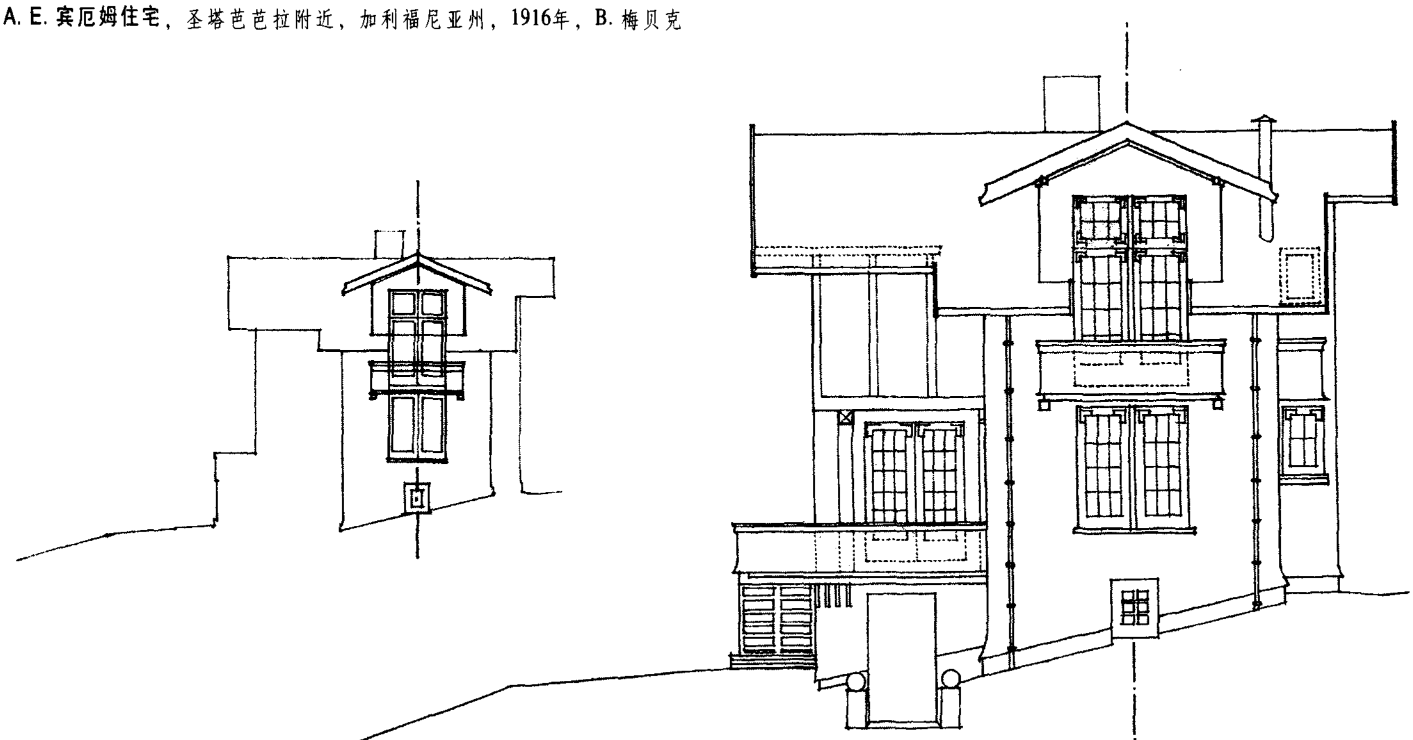


Robert W. Evans House, Chicago, Illinois, 1908, Frank Lloyd Wright
R. W. 埃文斯住宅，芝加哥，伊利诺斯州，1908年，F. L. 莱特



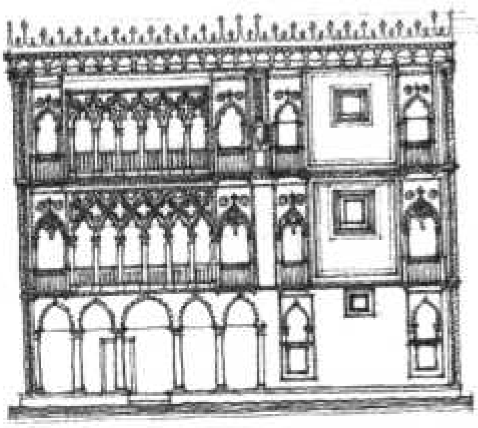
A.E. Bingham House, Near Santa Barbara, California, 1916, Bernard Maybeck

A. E. 宾厄姆住宅，圣塔芭芭拉附近，加利福尼亚州，1916年，B. 梅贝克



Isaac Flagg House II, Berkeley, California, 1912, Bernard Maybeck

弗莱格二号住宅，伯克利，加利福尼亚州，1912年，B. 梅贝克



Ca d'Oro, *Venice, 1424–1436, Giovanni and Bartolomeo Buon*

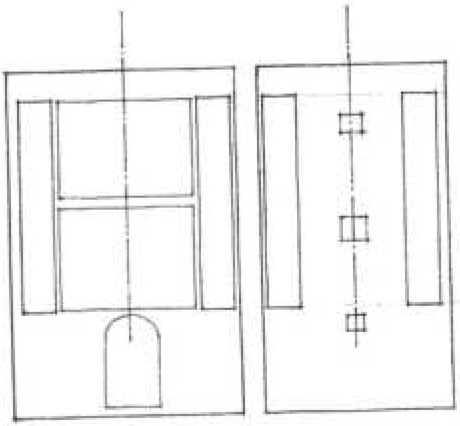
黄金大楼，威尼斯，1424年—1436年，乔万尼及B. 鲍恩

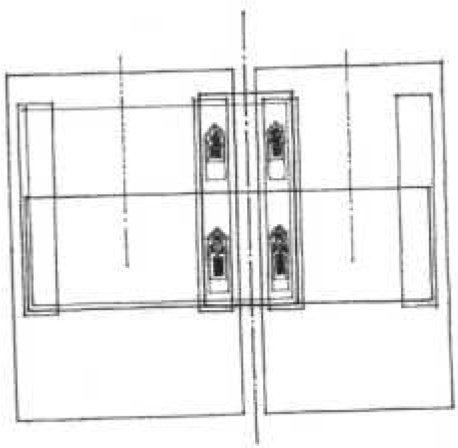


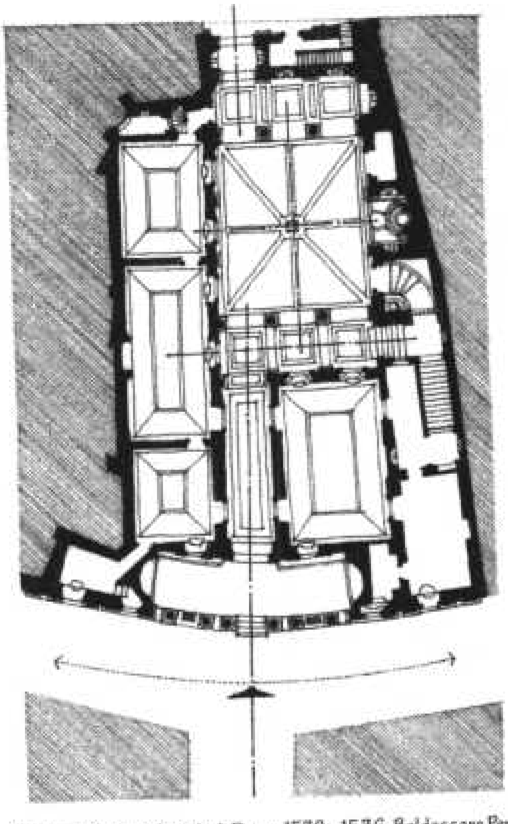


Frank Lloyd Wright Studio,
Oak Park, Illinois, 1889

F. L. 莱特工作室，橡树公园，伊利诺斯州，1889年

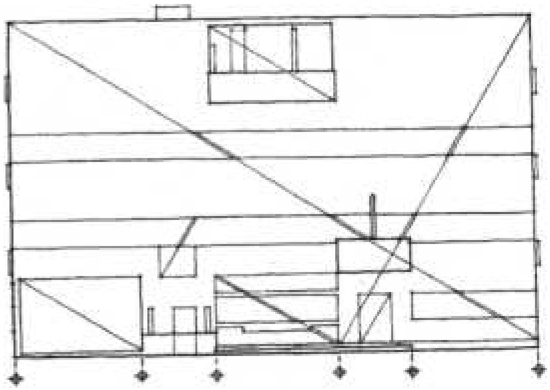


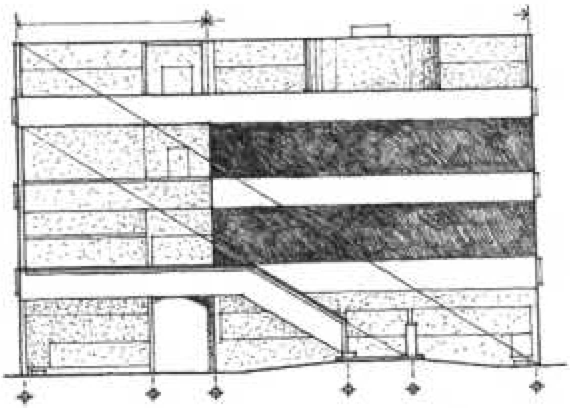


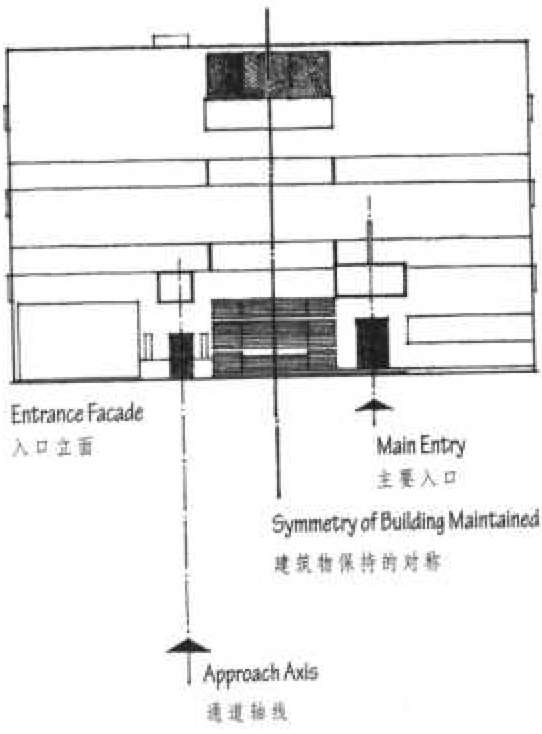


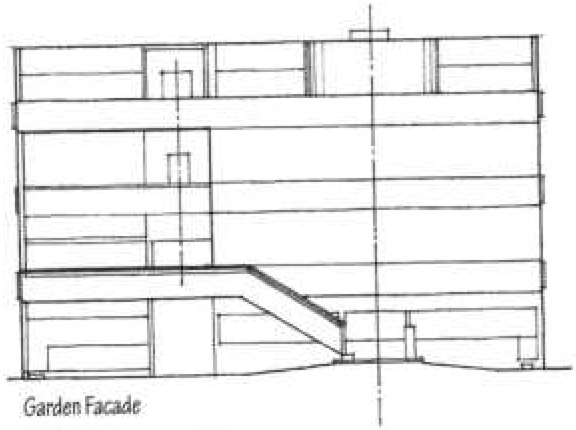
Palazzo Pietro Massimi, *Rome, 1532–1536, Baldassare Peruzzi*
A symmetrical facade leading into an asymmetrical interior.

彼得洛麦西米宫，罗马，1532年—1536年，B. 伯鲁齐
对称的立面通向不对称的室内。

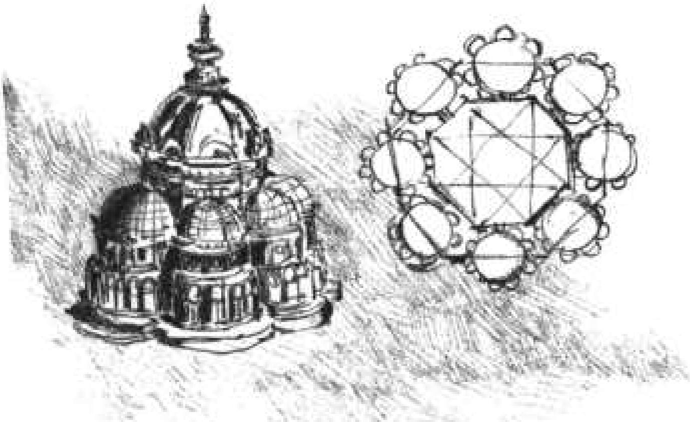




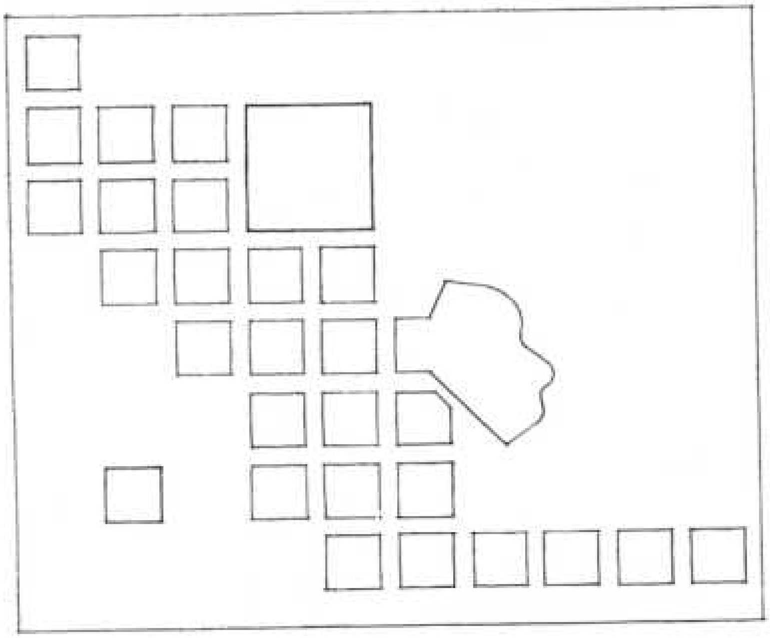




Villa Garches, Vaucresson, France, 1926–1927, Le Corbusier
加歇别墅，沃克里森，法国，1926年—1927年，勒·柯布西埃



After a sketch of an ideal church by Leonardo da Vinci
根据列奥纳多·达·芬奇所作的理想教堂草图绘制



The principle of hierarchy implies that in most if not all architectural compositions, real differences exist among their forms and spaces. These differences reflect the degree of importance of these forms and spaces, as well as the functional, formal, and symbolic roles they play in the organization. The value system by which relative importance is measured will of course depend on the specific situation, the needs and desires of the users, and the decisions of the designer. The values expressed may be individual or collective, personal or cultural. In any case, the manner in which the functional or symbolic differences among a building's elements are revealed is critical to the establishment of a visible, hierarchical order among its forms and spaces.

即使不是全部，也是在绝大部分建筑构图中，等级原理是指存在于建筑的形式与空间中的真实差别。这些差别反映出在建筑组合中形式与空间的重要程度不同，它们在功能、形式以及象征意义方面所起的作用也不同。当然，用来衡量相对重要性的价值体系取决于特殊的处境，使用者的需要与愿望，以及设计者的决策。体现出的价值，可能是个体的也可能是集体的，可能是人为的也可能是文化形成的。但无论如何，用何种方式去体现建筑要素功能和意义上的差别，是在建筑的形式与空间当中建立一种可见的、等级化秩序的关键。

For a form or space to be articulated as being important or significant to an organization, it must be made uniquely visible. This visual emphasis can be achieved by endowing a form or shape with:

- *exceptional size*
- a unique shape
- a strategic location

要表明在建筑组合中某个形式或空间的重要性和特别意义，这个形式或空间必须在视觉上与众不同。表现视觉重点可以通过以下方式：

- 特别的尺寸
- 独特的形状
- 关键性的位置

In each case, the hierarchically important form or space is given meaning and significance by being an exception to the norm, an anomaly within an otherwise regular pattern.

在各种情形中，一个形式或空间在等级方面的意义和重要性是通过异常与正常的对比、规则图案中的不规则形状来体现的。

In an architectural composition, there can be more than a single dominant element. Secondary points of emphasis which have less attention value than the primary focal point create visual accents. These distinctive but subordinate elements can both accommodate variety and create visual interest, rhythm, and tension in a composition. If carried too far, however, this interest may be replaced by confusion. When everything is emphasized, nothing is emphasized.

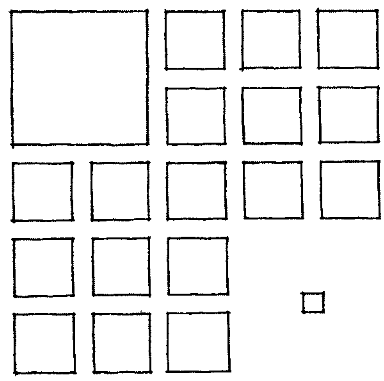
建筑构图中可以有多个主导要素。那些关注价值低于主要焦点的次要重点，形成了许多视觉特色。这些独特但从属的要素在一幅构图中，既能够带来变化，又能产生视觉趣味，韵律以及张力。然而，如果做得太过分，这种趣味就会被混乱取代。如果每件事物都加以强调，那就等于什么都没有强调。

Hierarchy by Size

A form or space may dominate an architectural composition by being significantly different in size from all the other elements in the composition. Normally, this dominance is made visible by the sheer size of an element. In some cases, an element can dominate by being significantly smaller than the other elements in the organization, but placed in a well-defined setting.

由尺寸形成的等级

一个形式或空间，可以因其尺寸在构图中独具一格，而取得建筑构图的支配地位。一般来说，这种支配地位是通过某个要素的绝对尺寸而实现的。但有的时候，建筑组合中某个要素也可以因为远远小于其他要素，但布置在一个特征明显的位置上，而取得支配地位。

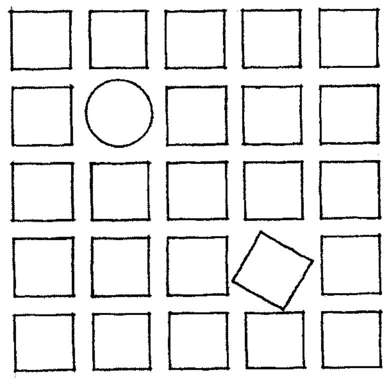


Hierarchy by Shape

A form or space can be made visually dominant and thus important by clearly differentiating its shape from that of the other elements in the composition. A discernible contrast in shape is critical, whether the differentiation is based on a change in geometry or regularity. Of course, it is also important that the shape selected for the hierarchically significant element be compatible with its functional use.

由形状形成的等级

一个形式或空间，可以因其形状明显地区别于构图中其他要素的形状，而在视觉上占据支配地位，并因此而具有重要性。无论这种区别是几何图形的变化还是规律性的变化，形状的鲜明对比是问题的关键。当然，等级重要的要素其形状的选择必须与它的功能用途相符合，这也是不可忽视的。



Hierarchy by Placement

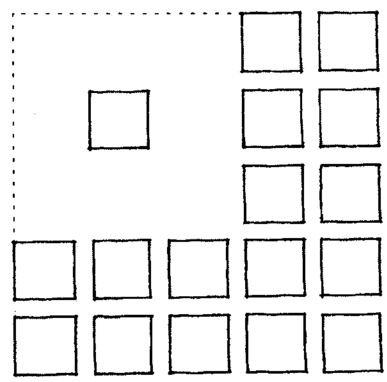
A form or space may be strategically placed to call attention to itself as being the most important element in a composition. Hierarchically important locations for a form or space include:

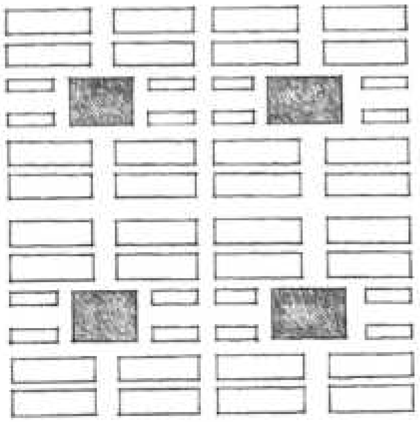
- the termination of a linear sequence or axial organization
- the centerpiece of a symmetrical organization
- the focus of a centralized or radial organization
- being offset above, below, or in the foreground of a composition

由位置形成的等级

一个形式或空间，可以被刻意地布置在引人注目的位置，而成为构图中最为重要的要素。对形式或空间而言，等级重要的位置包括：

- 线式序列或轴线组合的端点
- 对称组合的中心部分
- 集中式或放射式组合的焦点
- 向上、向下偏移或居于构图的最显著位置

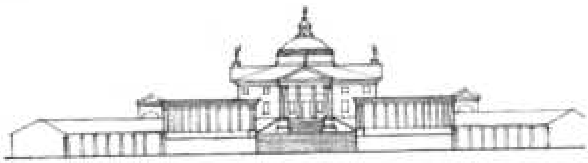




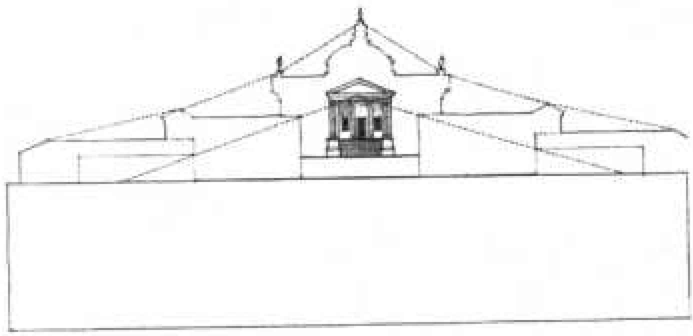
Plan for Savannah, Georgia, 1733, James Oglethorpe
萨凡纳平面，佐治亚州，1733年，J.奥格勒索普

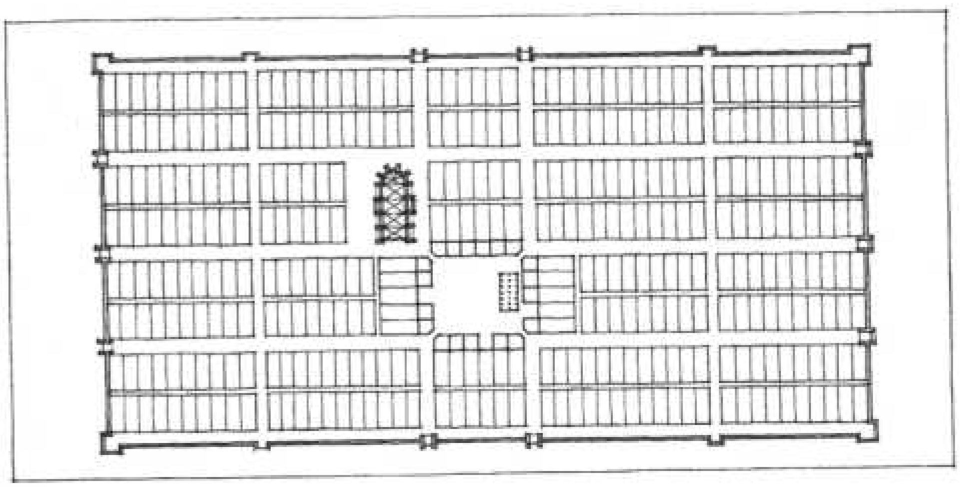


Savannah Plan, after 1856
萨凡纳平面，1856年以后



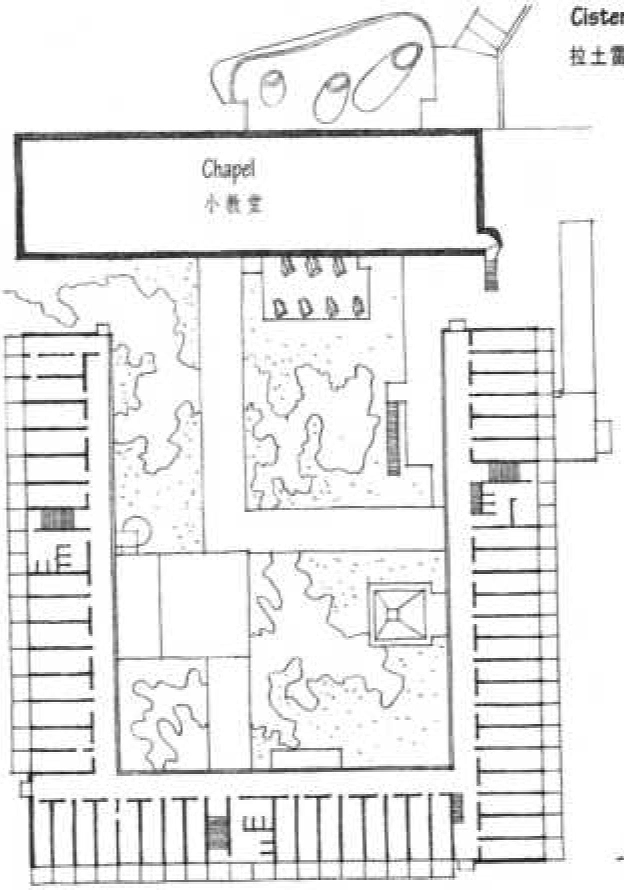
Villa Trissino at Meledo, From *The Four Books on Architecture*, Andrea Palladio
梅莱多的特利森诺别墅，选自《建筑学四书》，A.帕拉蒂奥



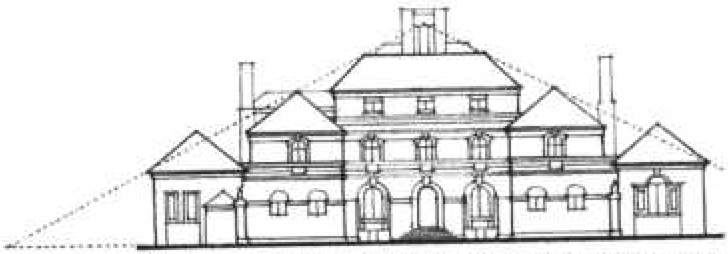


Plan of Montfazier, France,
a Medieval town founded in 1284
蒙帕吉尔城平面，法国，一座
中世纪城市，建于1284年

Cistercian Monastery of La Tourette, near Lyons, France, 1956–1959, Le Corbusier
拉土雷修道院，里昂附近，法国，1956年—1959年，勒·柯布西埃



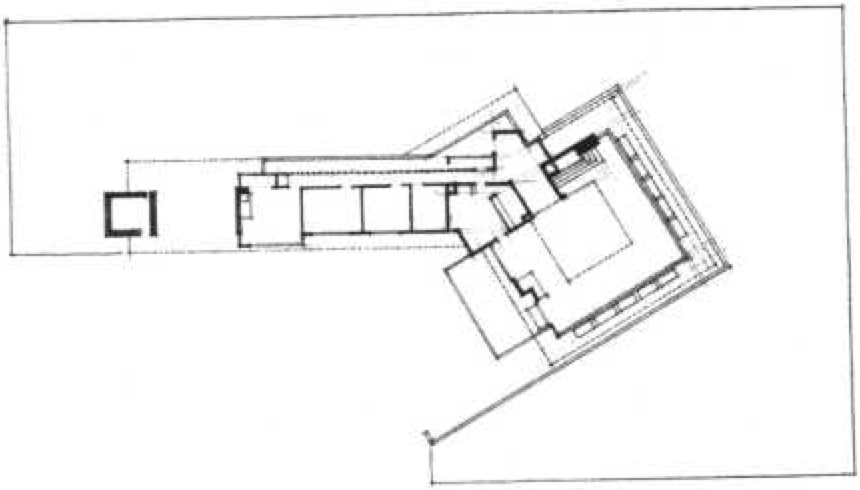
Fourth Floor Plan
四层平面



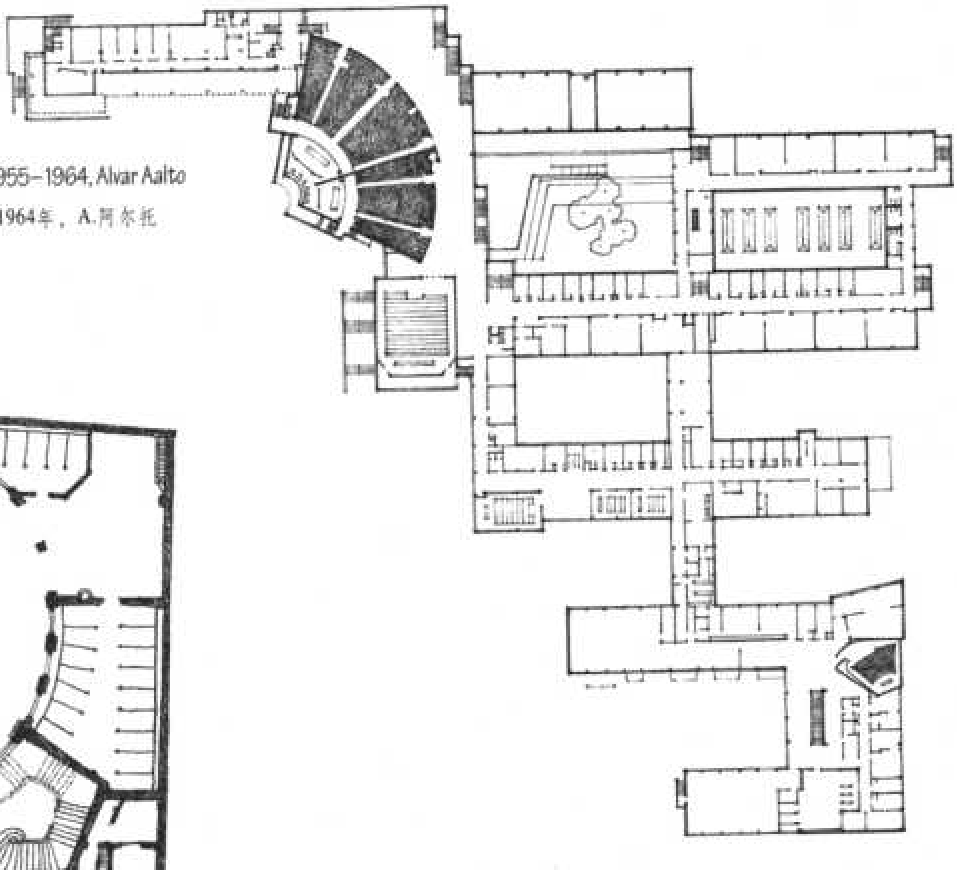
Heathcote (Hemingway House), Ilkley, Yorkshire, England, 1906, Sir Edwin Lutyens
海明威住宅，伊尔克雷，约克郡，英格兰，1906年，E.拉特恩斯爵士

View of Florence *illustrating the dominance of the cathedral over the urban landscape*
佛罗伦萨景象，表明大教堂在城市景观中占有支配地位

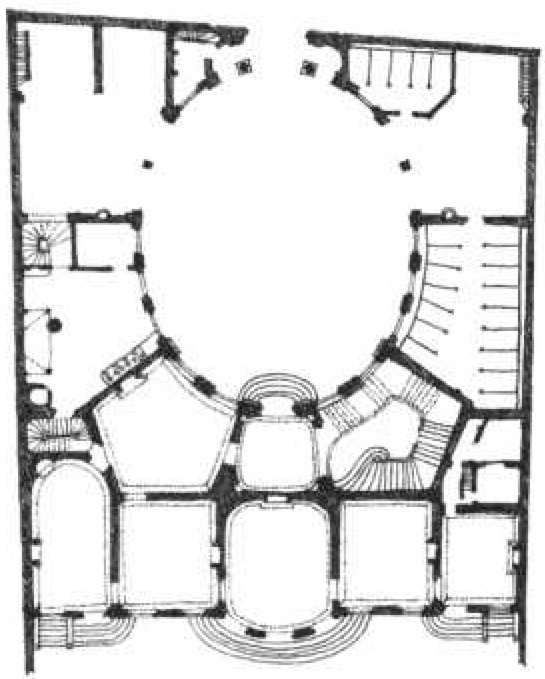




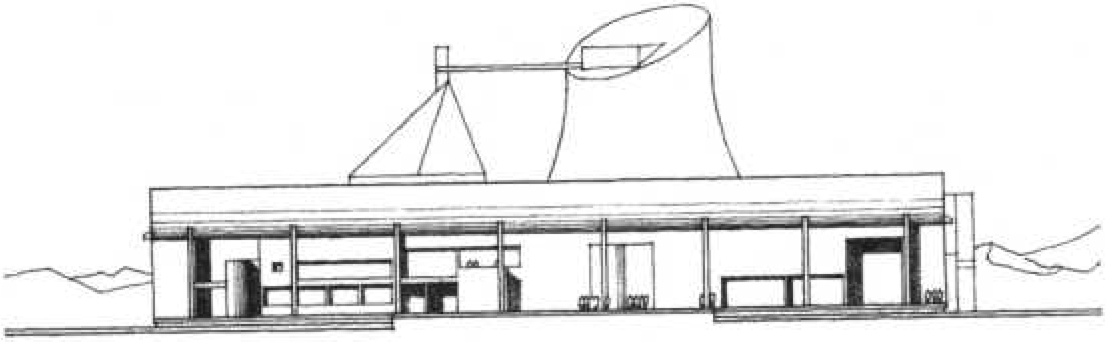
Lowell Walter House, Quasqueton, Iowa, 1949, Frank Lloyd Wright
L. 沃尔特住宅，科斯科顿，衣阿华州，1949年，F. L. 莱特

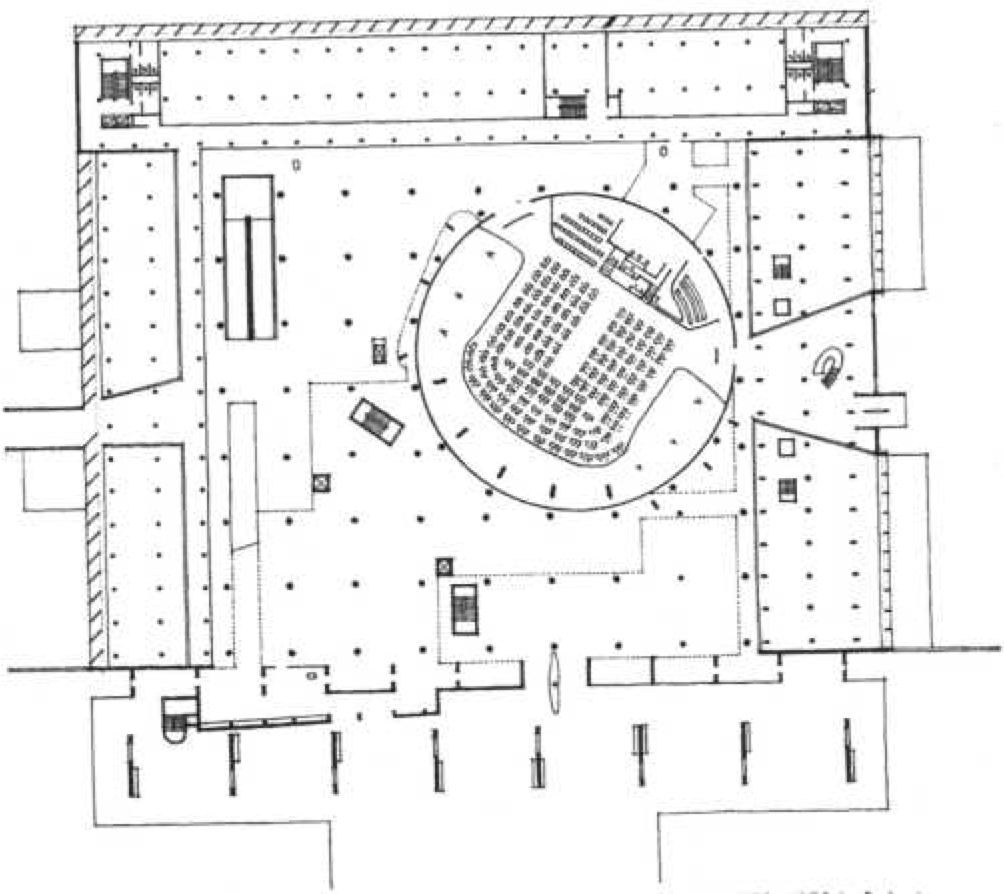


Institute of Technology, Otaniemi, Finland, 1955–1964, Alvar Aalto
理工学院，奥塔尼爱米，芬兰，1955年—1964年，A.阿尔托



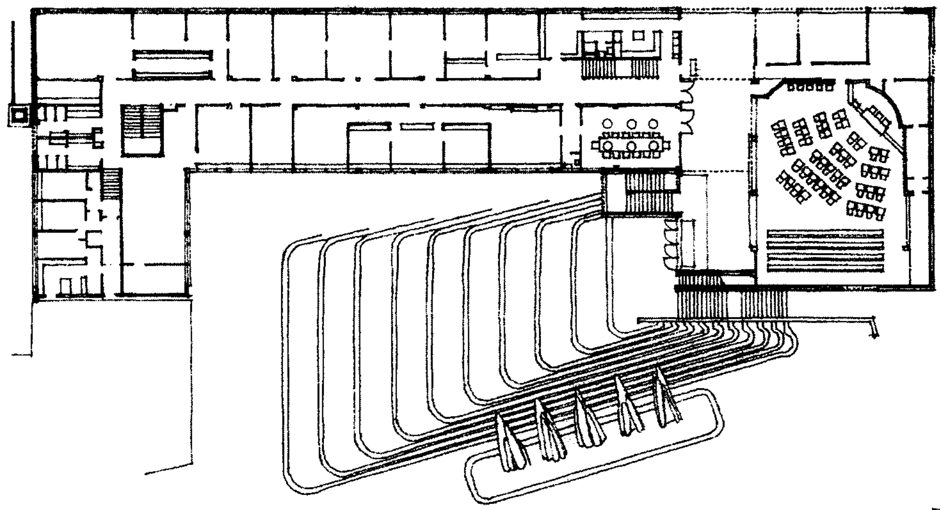
Hôtel Amelot, Paris, 1710–1713, Germain Boffrand
阿美洛特饭店，巴黎，1710年—1713年，G. 波弗兰德



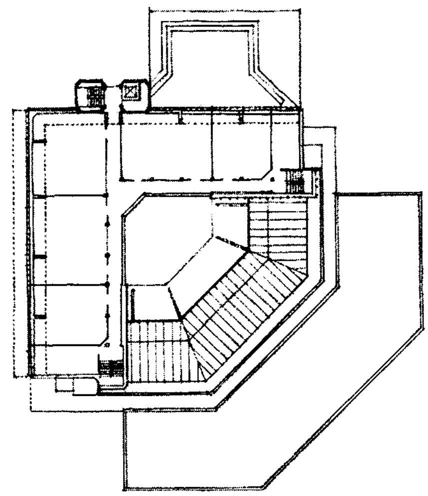


Legislative Assembly Building, Chandigarh, Capitol Complex of Punjab, India, 1956–1959, Le Corbusier

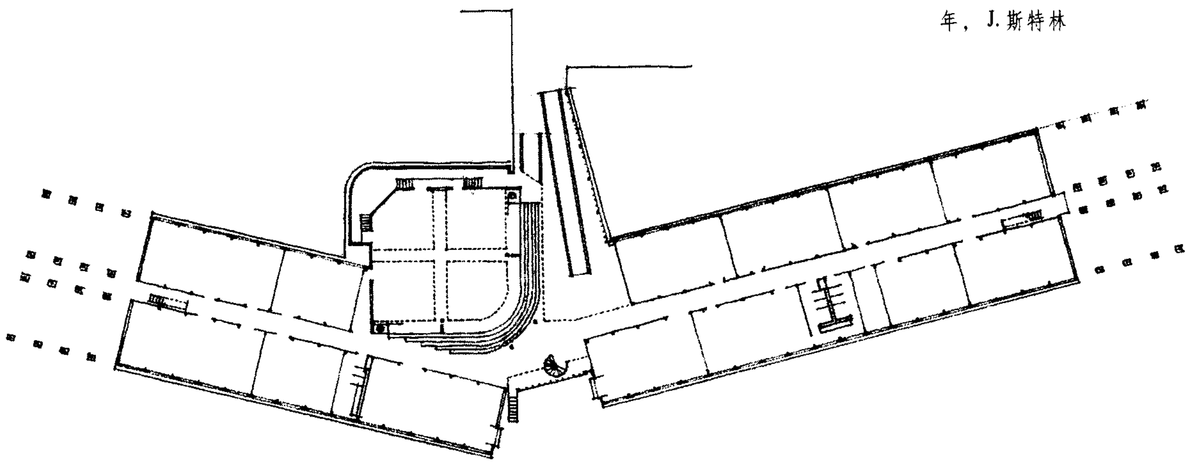
议会大厦，昌迪加尔，旁遮普的议会综合体，印度，1956年—1959年， 勒·柯布西埃



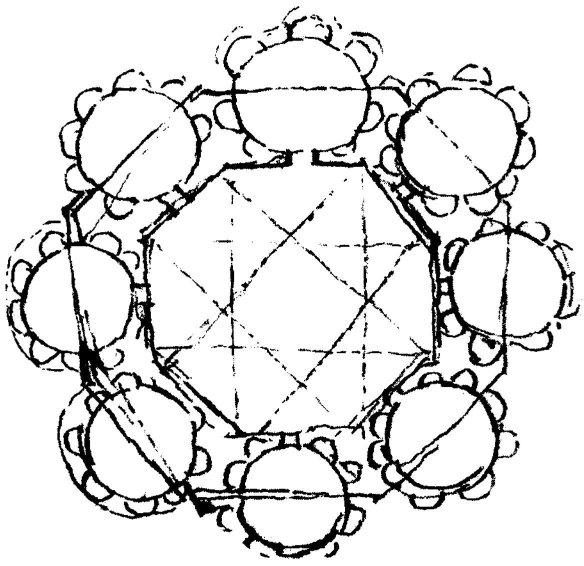
Town Hall, Seinäjoki, 1961–1965, Alvar Aalto
市政厅，塞纳约基，1961年—1965年，A. 阿尔托



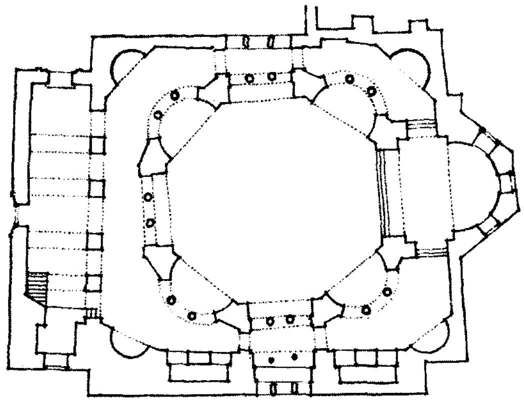
History Faculty Building, Cambridge University, England, 1964–1967, James Stirling
历史系大楼，剑桥大学，英格兰，1946年—1967年，J. 斯特林



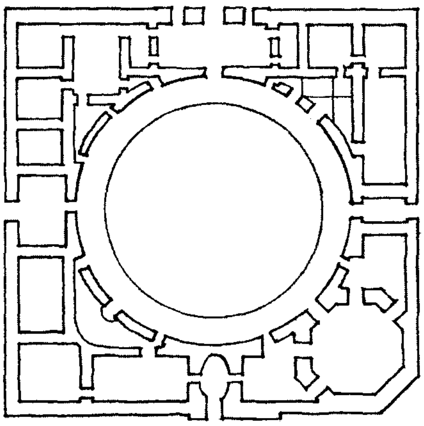
Olivetti Training School, Haslemere, England, 1969–1972, James Stirling
奥利弗蒂培训学校，赫泽尔米尔，英格兰，1969年—1972年，J. 斯特林



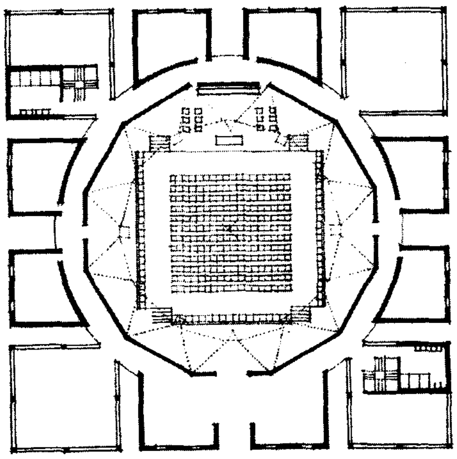
Plan of an Ideal Church, c. 1490, Leonardo da Vinci
理想教堂平面，1490年，列奥纳多·达·芬奇



S.S. Sergius and Bacchus, Constantinople (Istanbul), A.D. 525–530
S. S. 塞朱斯及巴彻斯，君士坦丁堡（伊斯坦布尔），525年—530年



Palace of Charles V, Granada, 1527–1568, Pedro Machuca
查尔斯五世宫殿，格拉纳达，1527年—1568年，P.马丘卡

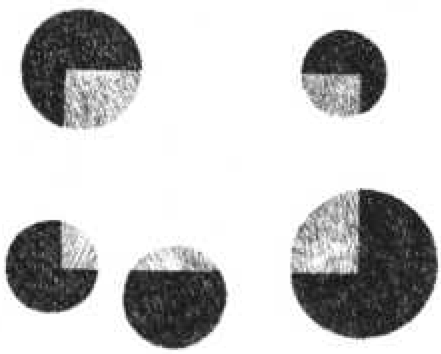


First Unitarian Church, First Design, Rochester, New York, 1959, Louis Kahn
第一唯一神教教堂，第一次设计，罗彻斯特，纽约州，1959年，L.康



Excerpt from **Gavotte I, Sixth Cello Suite,** by Johann Sebastian Bach (1685–1750). Transcribed for classical guitar by Jerry Snyder.

选自J.S.巴赫（1685年—1750年）的《加伏特舞曲》第六大提琴曲第一乐章，由J.斯奈德改编为古典吉他曲。



A datum refers to a line, plane, or volume of reference to which other elements in a composition can relate. It organizes a random pattern of elements through its regularity, continuity, and constant presence. For example, the lines of a musical staff serve as a datum in providing the visual basis for reading notes and the relative pitches of their tones. The regularity of their spacing and their continuity organizes, clarifies, and accentuates the differences between the series of notes in a musical composition.

基准是指在构图中与其他要素有关的一条参考线、参考面或体。基准通过它的规则性、连续性和稳定性，将多种要素构成的一个任意图案组合起来。例如，五线谱的乐谱线可以看作是基准线，在人们辨认音符和音调相对高低时提供了直观的基础。五线谱间距的规则性和连续性使乐曲中各不相同的一系列音符联成一体，同时也很清楚地表明并强调了它们之间的差别。

A preceding section illustrated the ability of an axis to organize a series of elements along its length. In effect, the axis was serving as a datum. A datum, however, need not be a straight line. It can also be planar or volumetric in form.

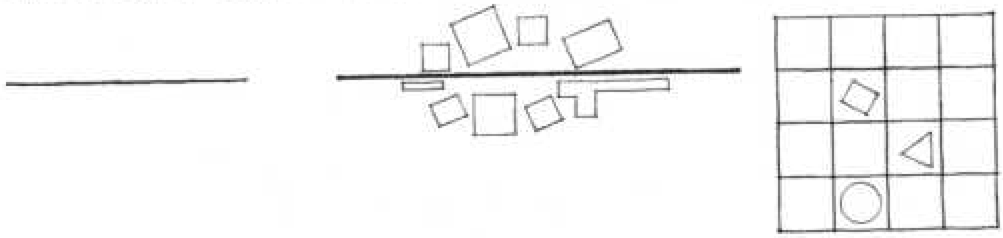
前面说过，轴线有沿其轴向组合一系列要素的能力。从效果上说，轴线实际上就是基准线。但是，一个基准不一定非得是直线，它可以采用面或体的形式。

To be an effective ordering device, a linear datum must have sufficient visual continuity to cut through or bypass all of the elements being organized. If planar or volumetric in form, a datum must have sufficient size, closure, and regularity to be seen as a figure that can embrace or gather together the elements being organized within its field.

作为一种有效的组织秩序的手段，一条基准线必须有充分的视觉连续性，以便穿过或从外侧经过它所组合的全部要素。如果基准是面或体，它必须有足够的尺寸、围合感和规则性，才可以被看作能把组合要素在其领域内围起或聚集起来的形体。

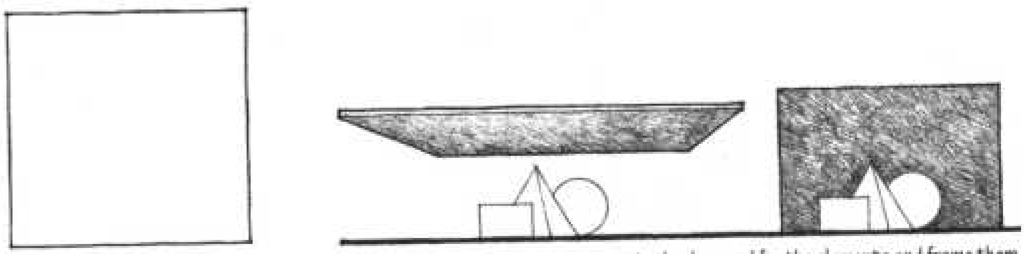
Given a random organization of dissimilar elements, a datum can organize the elements in the following ways:
基准能以下列方式，将一组随意的、不同要素的自由组合组织起来：

Line
线



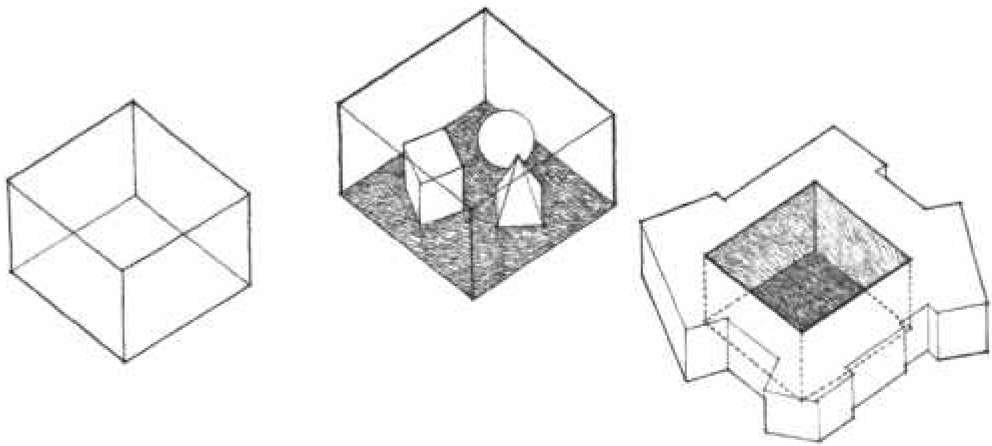
A line can cut through or form a common edge for the pattern, while a grid of lines can form a neutral, unifying field for the pattern.
一条直线可以穿过一个图案，或者形成图案的公共边，而直线网格则能给图案形成一个中性的、统一的区域。

Plane
面

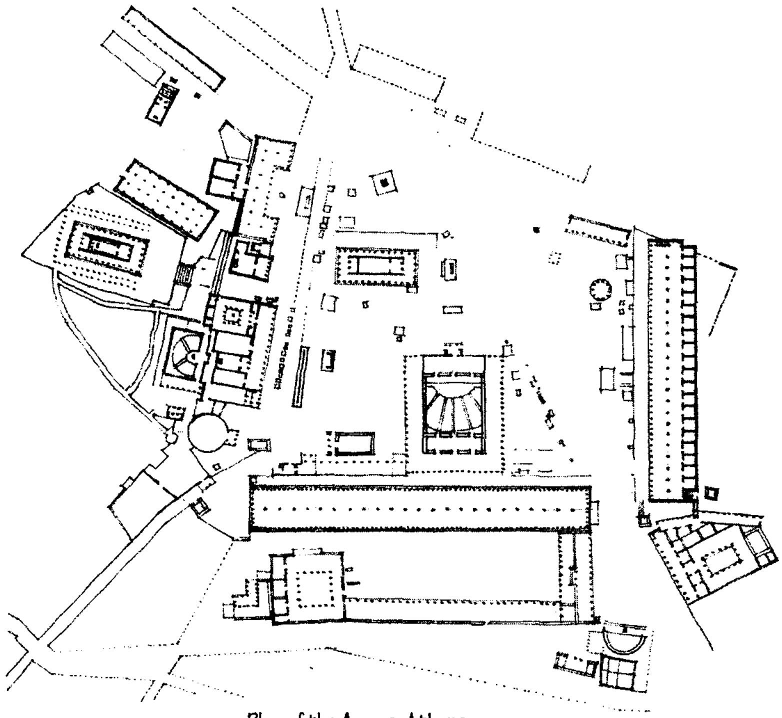


A plane can gather the pattern of elements beneath it or serve as an encompassing background for the elements and frame them in its field.
面可以将图案的要素聚集在它的下方，或者成为要素的背景，把要素框入其中。

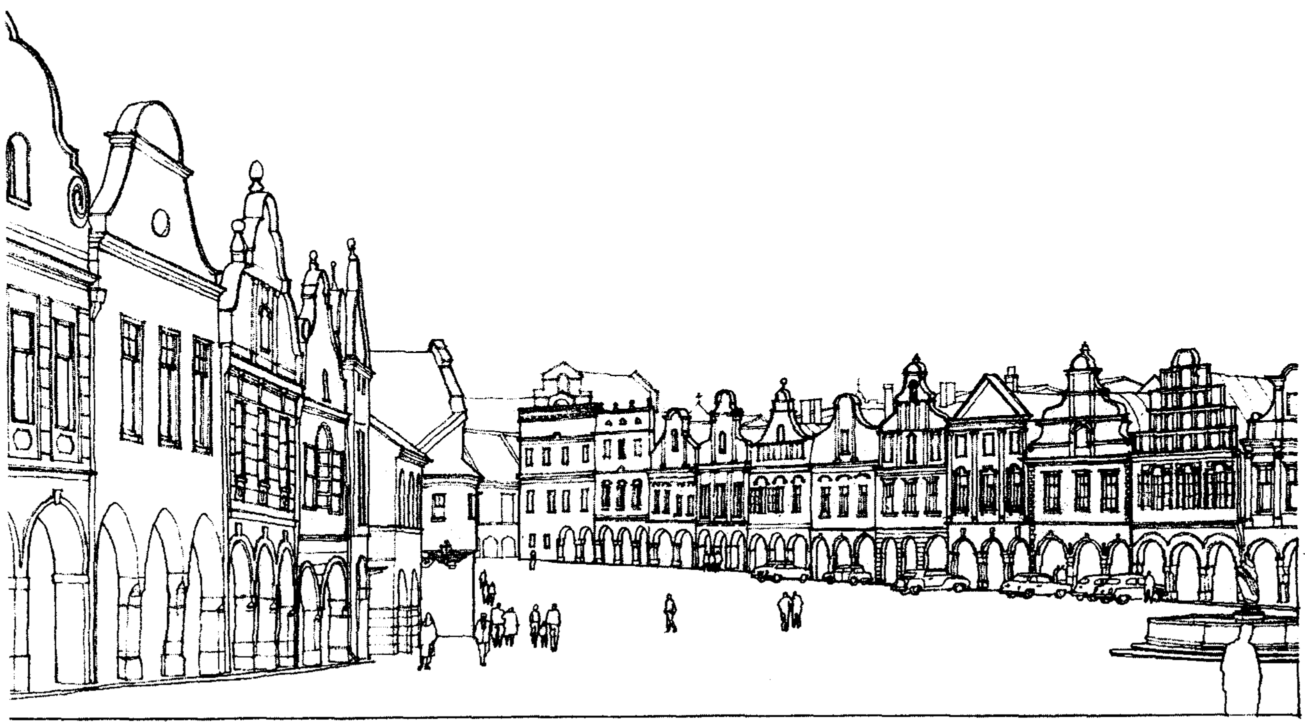
Volume
体



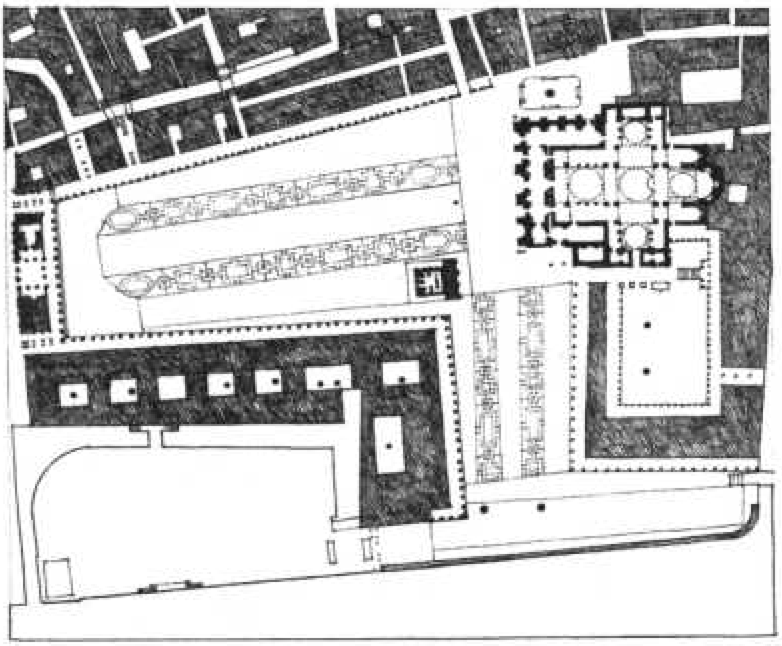
A volume can collect the pattern of elements within its boundaries or organize them along its perimeter.
体可以将图案的要素聚集在它的范围之内，或者沿其周边组合这些要素。



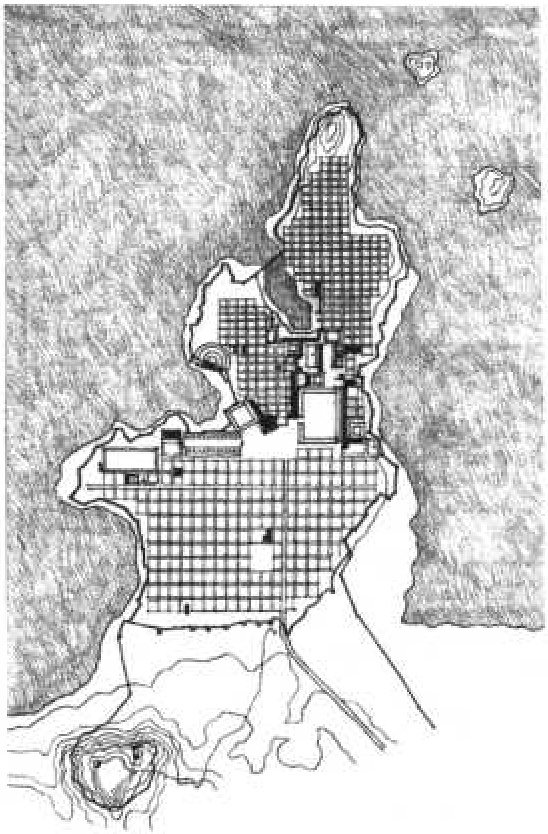
Plan of the **Agora**, Athens
阿格拉广场平面，雅典



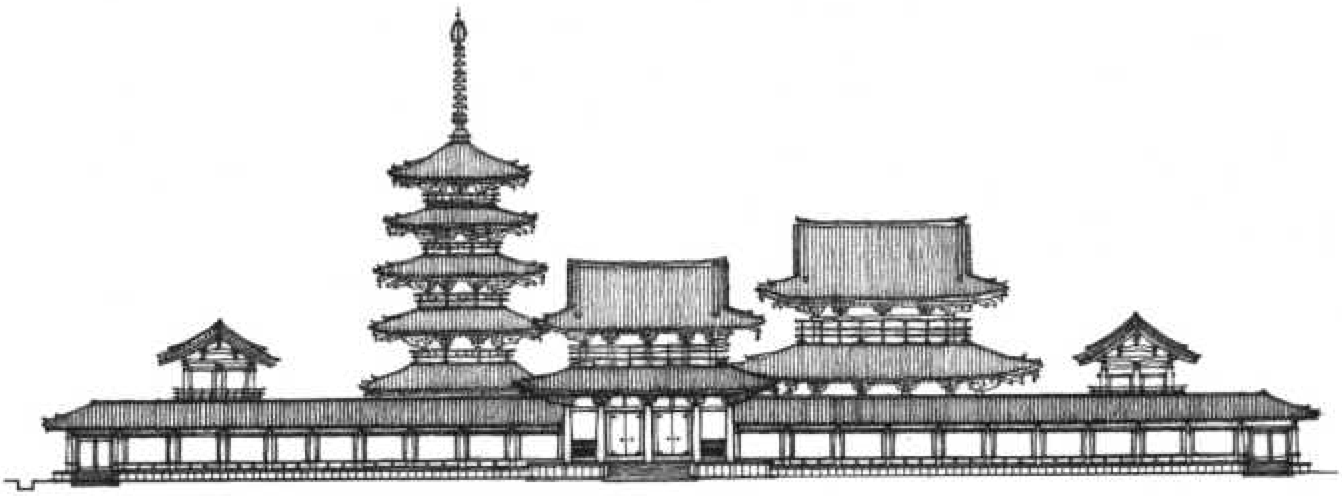
Arcades unify the facades of houses that front the town square of Telo, Czechoslovakia.
朝向特罗镇广场的房屋立面由**拱廊**统一起来，捷克斯洛伐克。



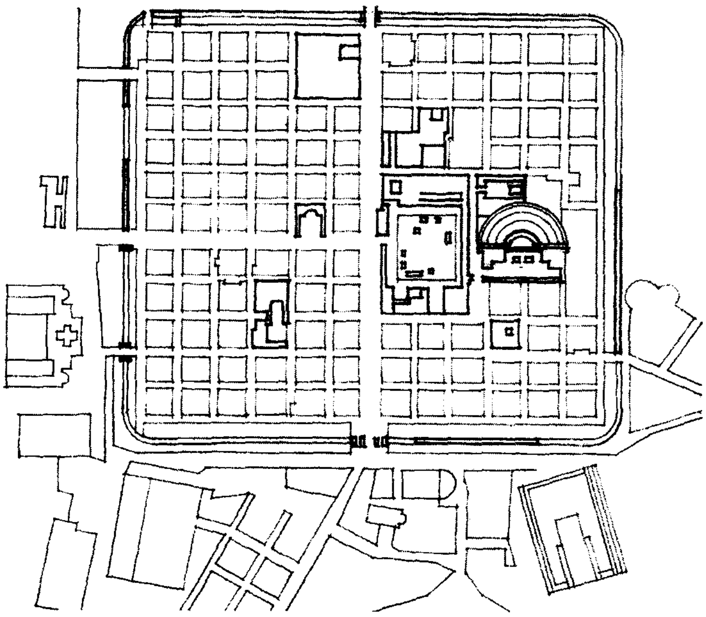
Piazza San Marco, Venice
圣马可广场，威尼斯



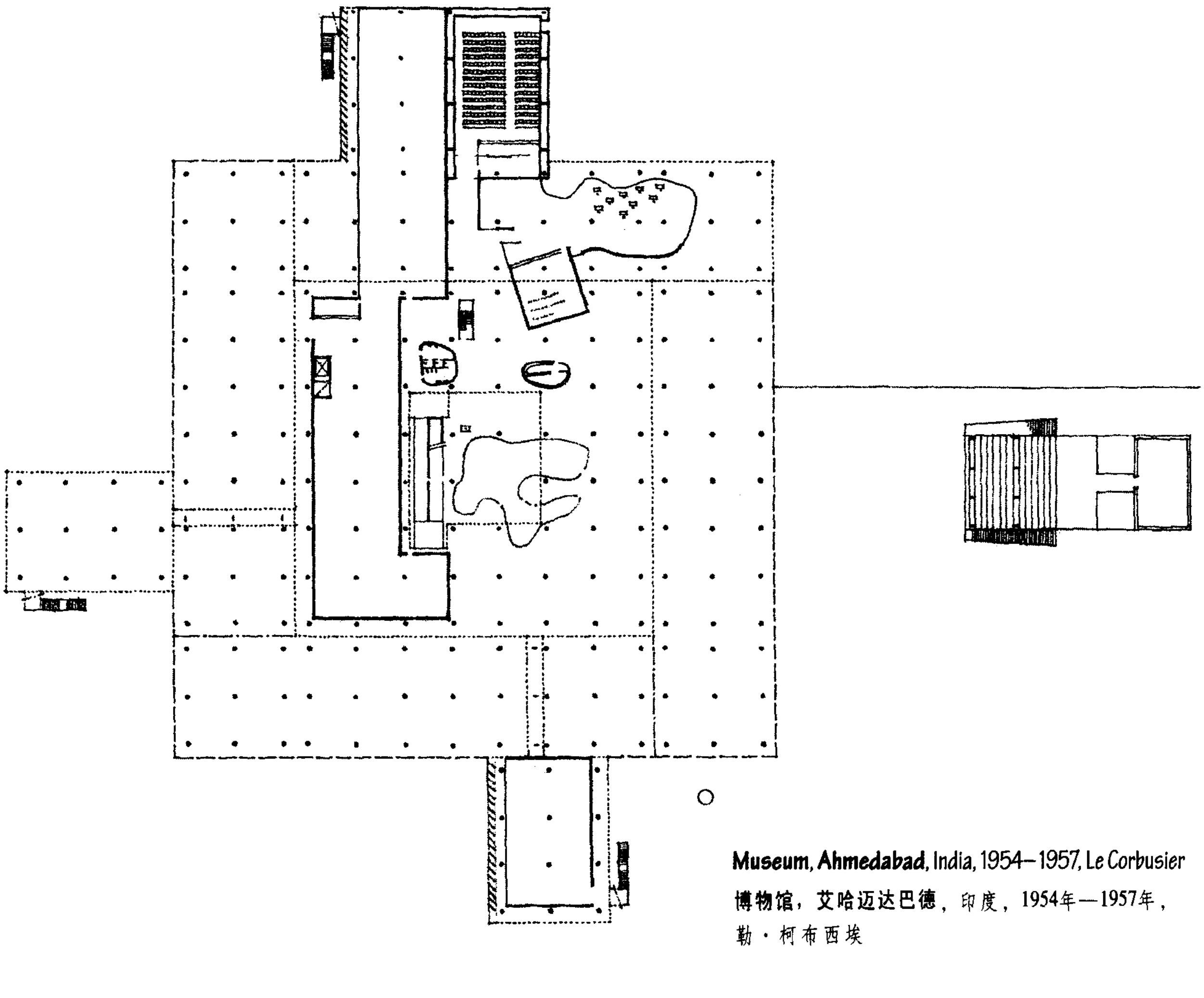
Plan of Miletus, 5th century B.C.
米勒图斯平面，公元前5世纪



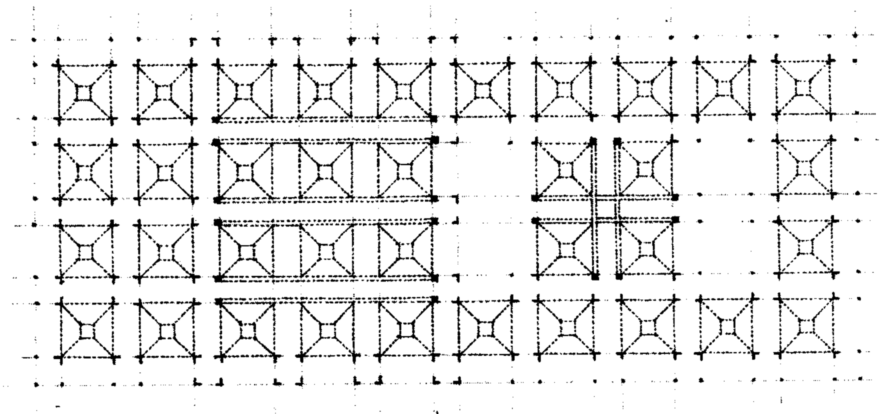
Horyu-Ji Temple Group, Nara Prefecture, Japan, A.D. 607–746
法隆寺建筑群，奈良县，日本，607年—746年



Town Plan of Timgad, a Roman colony in North Africa founded 100 B.C.
提姆加特镇平面，建在北非的罗马人居住区，建于公元前100年

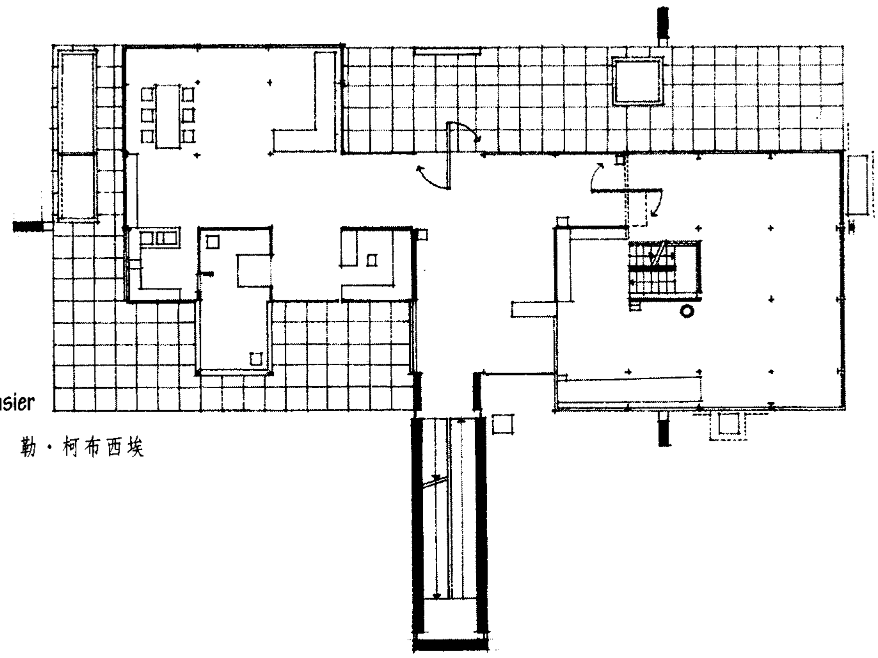


Museum, Ahmedabad, India, 1954–1957, Le Corbusier
博物馆，艾哈迈达巴德，印度，1954年—1957年，勒·柯布西埃



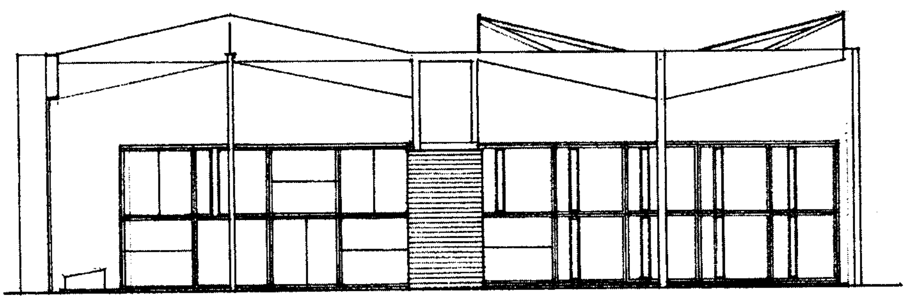
Structural Grid of Main Building, **Jewish Community Center,** Trenton, New Jersey, 1954–1959, Louis Kahn

主楼结构网格，**犹太人社区中心**，特伦顿，新泽西州，1954年—1959年，L. 康



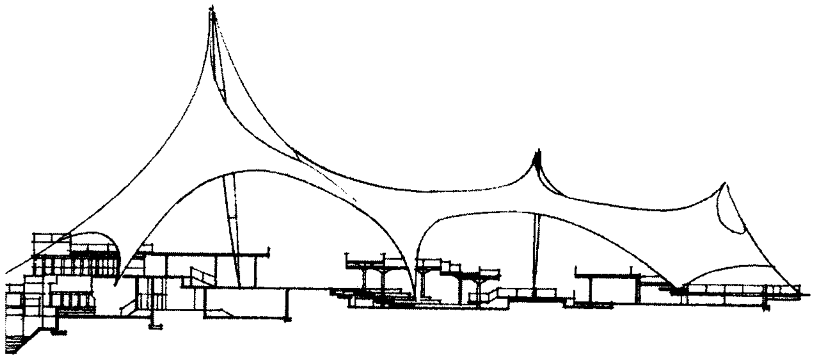
Centre Le Corbusier, Zurich, 1963–1967, Le Corbusier

勒·柯布西埃中心，苏黎世，1963年—1967年，勒·柯布西埃

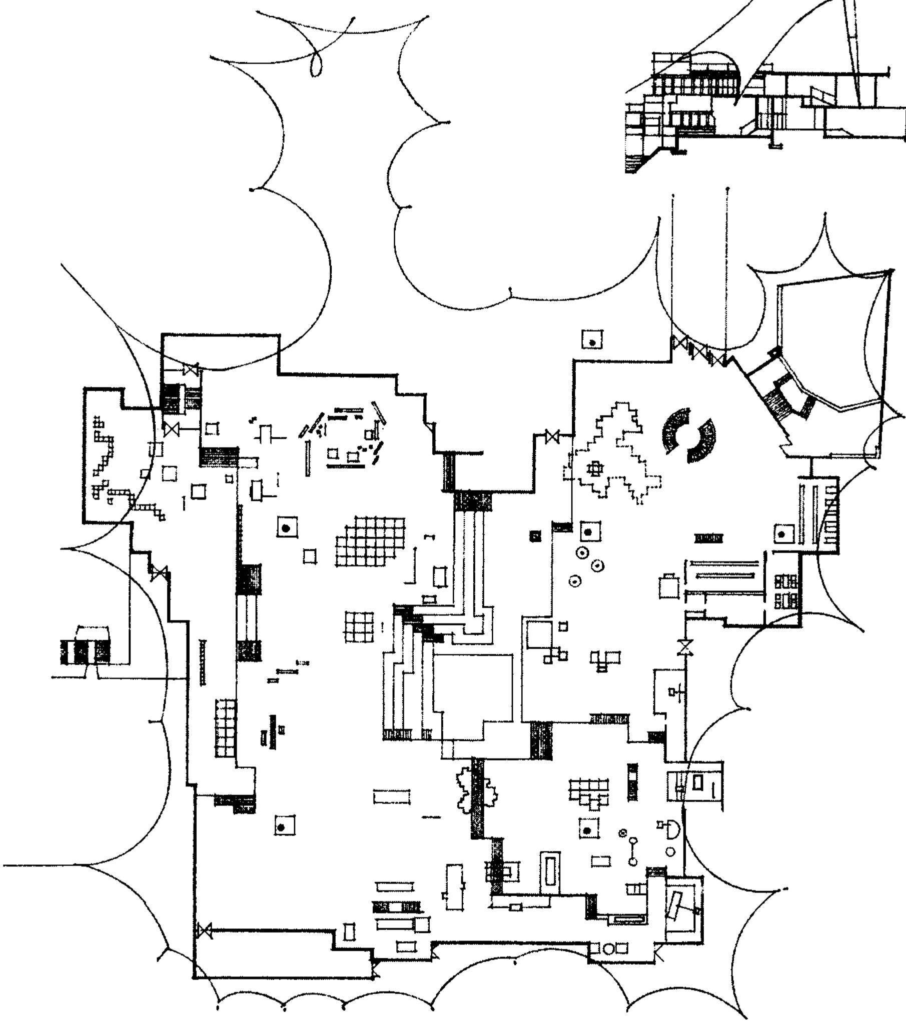


North Elevation

北立面

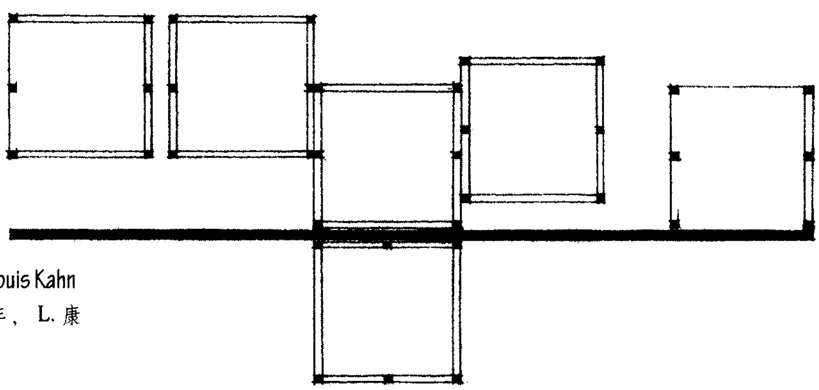


Section
剖面



German Pavilion, Montreal World Exposition, 1966–1967, Rolf Gutbrod and Frei Otto
德国展馆，蒙特利尔世界博览会，1966年—1967年，R. 古德伯罗及F. 奥托

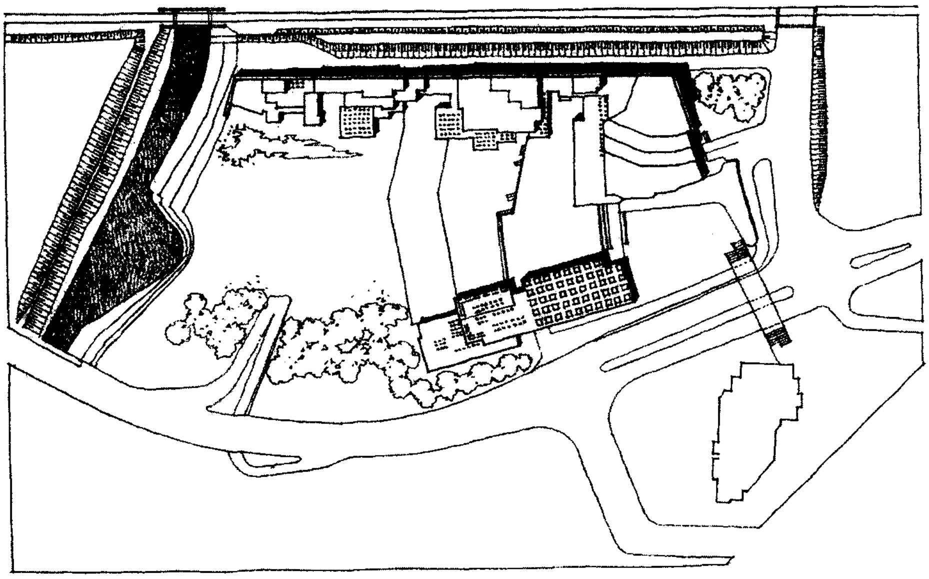
Ground Floor Plan
底层平面

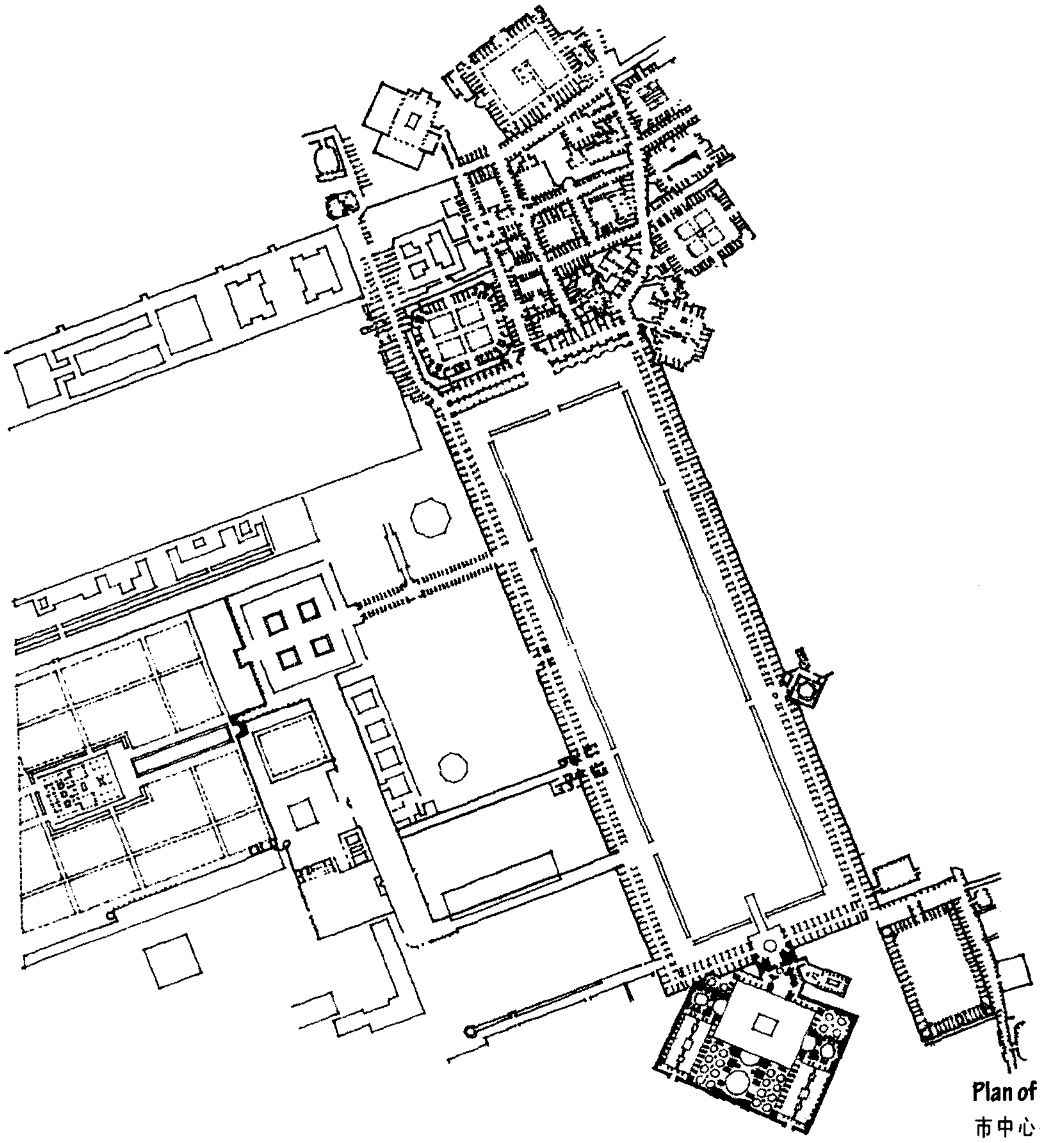


DeVore House (Project), Montgomery County, Pennsylvania, 1954, Louis Kahn
德·沃尔住宅（方案），蒙哥马利县，宾夕法尼亚州，1954年，L. 康

Cultural Center (Competition Entry), Leverkusen, Germany, 1962, Alvar Aalto

文化中心（竞赛入选方案），勒沃库森，德国，1962年，A. 阿尔托

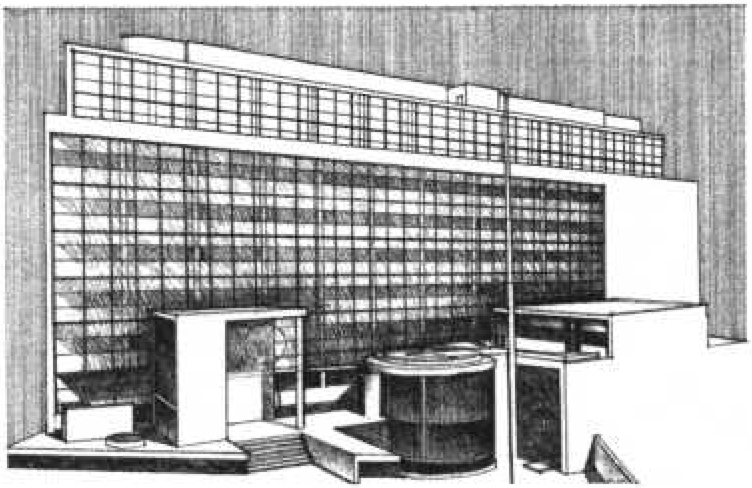


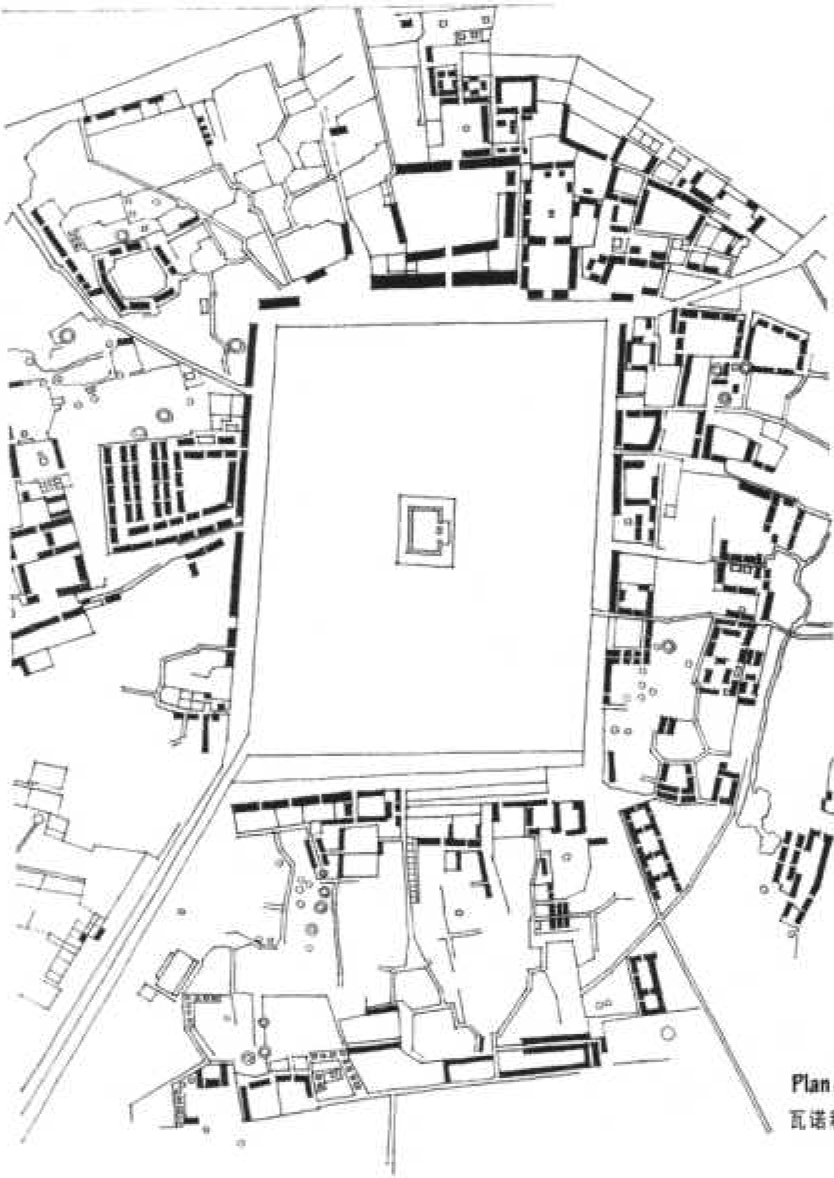


Plan of Civic Center, Isfahan, Capital of Persia, 1628

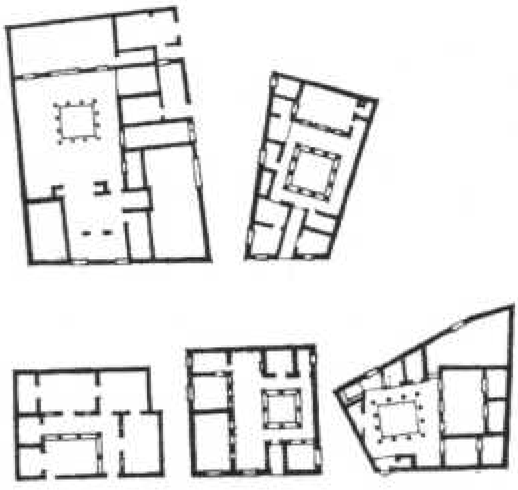
市中心平面，伊斯法罕，伊朗，1628年

Salvation Army Hostel, Paris, 1928–1933, Le Corbusier
救世军旅馆，巴黎，1928年—1933年，勒·柯布西埃

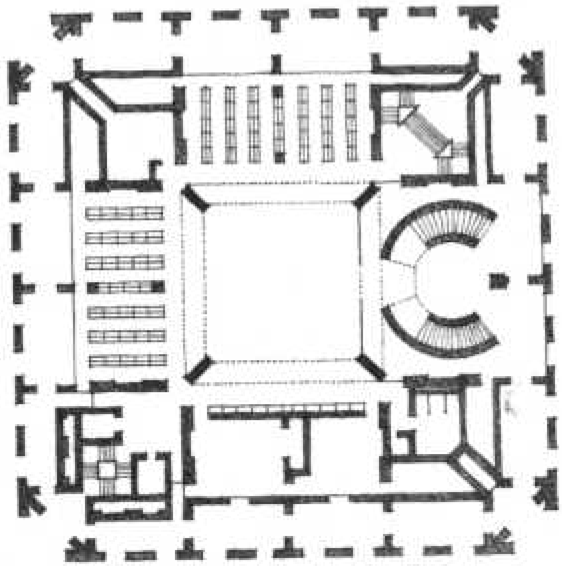




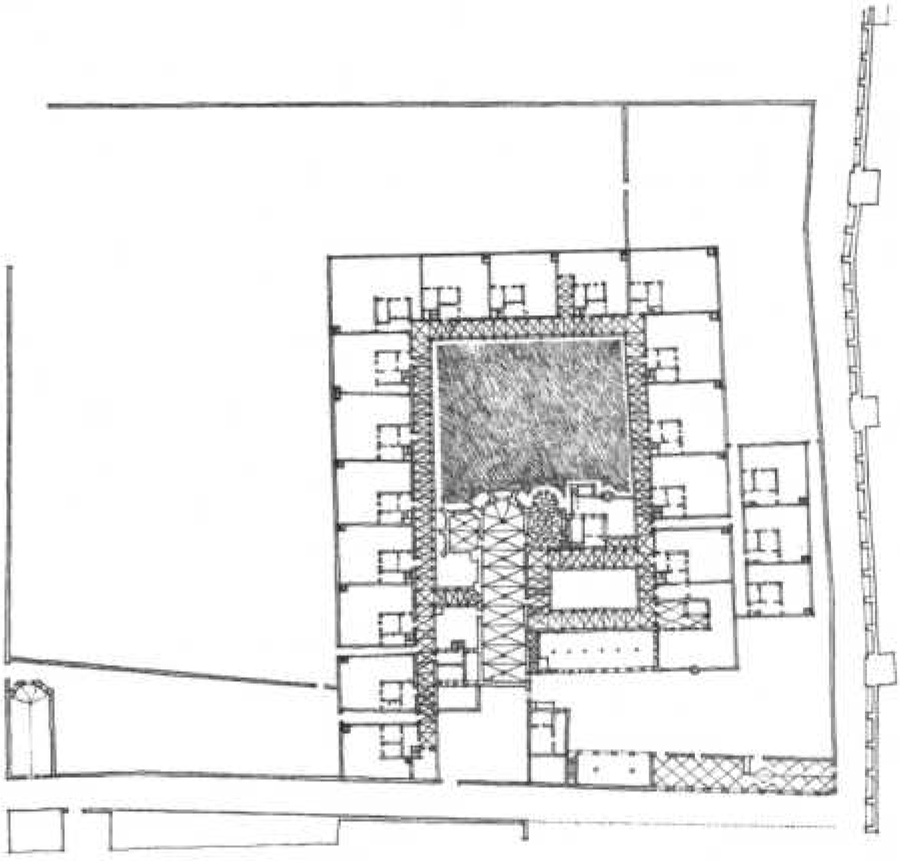
Plan of Huánoco, an Inca Town in central Peru
瓦诺科平面，秘鲁中部的印加人城镇



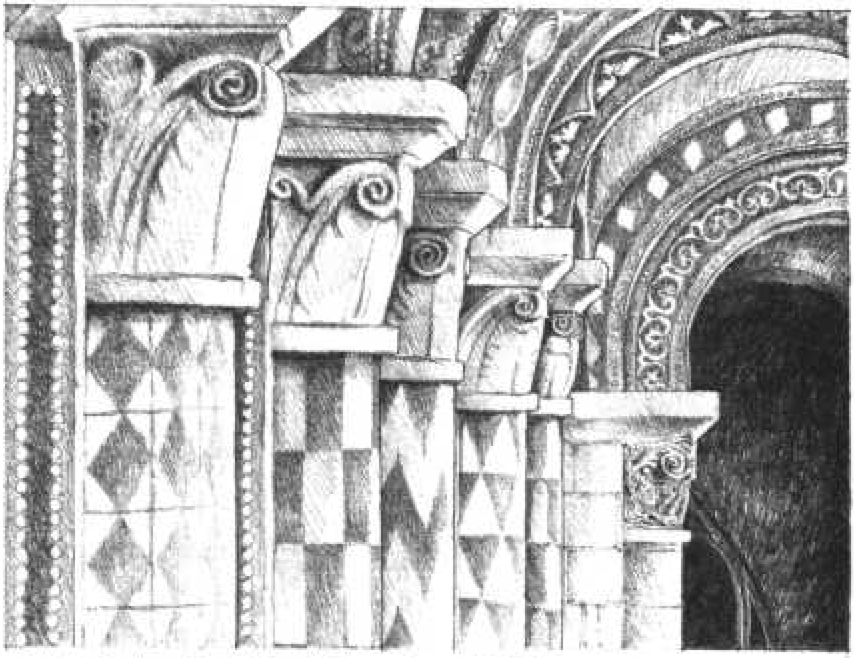
Plan of Peristyle Courtyard Houses on Delos, a Greek island in the Aegean
得洛斯岛上的中庭式住宅平面，爱琴海上的一个希腊岛屿



Library, Philip Exeter Academy, Exeter, New Hampshire, 1967–1972, Louis Kahn
图书馆，菲利普·埃克塞特学院，埃克塞特，新罕布什尔州，1967年—1972年，L. 康



Nuremberg Charterhouse, 1383
纽伦堡·卡尔特修道院，1383年



Column Details, **Notre Dame la Grande**, Poitiers, France, 1130–1145

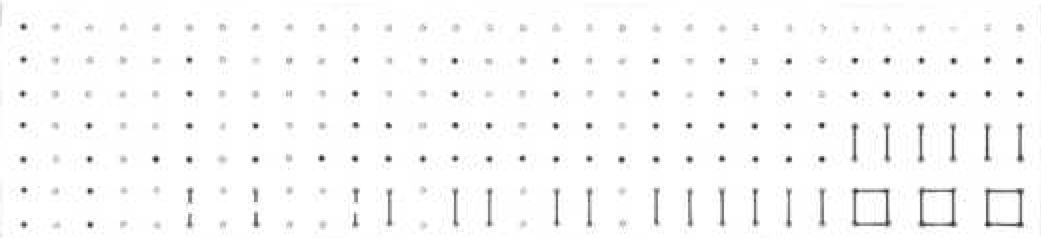
柱子细部，**拉·格兰德圣母院**，波瓦第尔，法国，1130年—1145年

Rhythm refers to any movement characterized by a patterned recurrence of elements or motifs at regular or irregular intervals. The movement may be of our eyes as we follow recurring elements in a composition, or of our bodies as we advance through a sequence of spaces. In either case, rhythm incorporates the fundamental notion of repetition as a device to organize forms and spaces in architecture.

韵律是指某种运动，其特点是要素或主题以规则或不规则的间隔图案化地重复出现。这种运动可能是我们的眼睛跟随构图中重复出现的要素的结果，也可能是我们的身体穿过空间序列的结果。无论是哪种情况，韵律都体现了重复出现的基本意图，使之成为组合建筑空间和形式的一种手段。

Almost all building types incorporate elements that are by their nature repetitive. Beams and columns repeat themselves to form repetitive structural bays and modules of space. Windows and doors repeatedly puncture the surfaces of a building to allow light, air, views, and people to enter the interior. Spaces often recur to accommodate similar or repetitive functional requirements in the building program. This section discusses the patterns of repetition that can be utilized to organize a series of recurring elements, and the resultant visual rhythms these patterns create.

几乎所有的建筑类型都会有本质上可以重复的要素。梁柱的重复形成重复的结构跨度和空间模数；门窗在建筑物表面上重复地开洞，以使光线、空气、景观和人进入室内。在建筑设计纲要中为了满足相似或重复的功能要求，空间常常反复重现。本节要讨论的是可以用来组合一系列要素反复出现的重复图形，以及这些图形产生的视觉韵律结果。

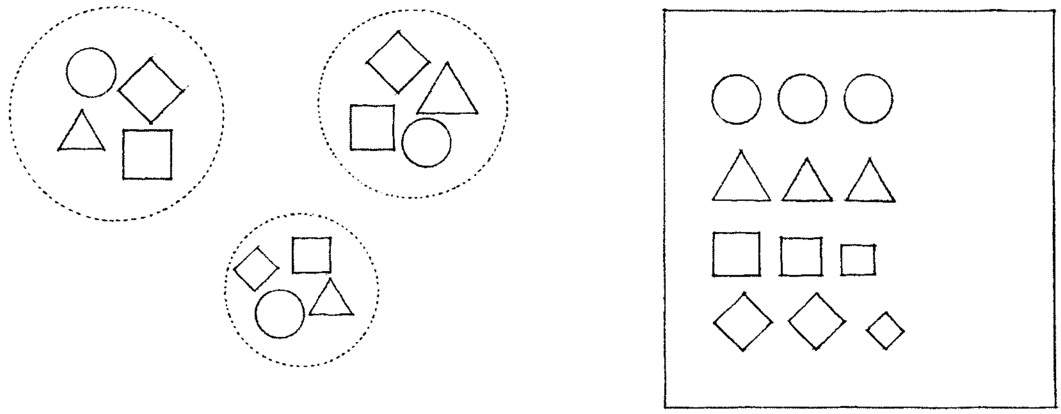


We tend to group elements in a random composition according to:
- their closeness or proximity to one another
- the visual characteristics they share in common

我们倾向于把一个任意构图中的要素按照以下方式进行分组：
- 它们彼此之间的近似程度
- 它们共有的视觉特征

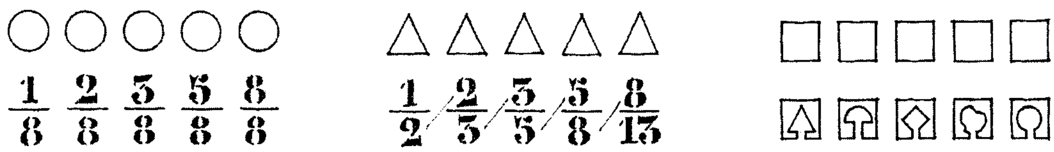
The principle of repetition utilizes both of these concepts of visual perception to order recurring elements in a composition.

重复性原理利用以上两个视觉概念来为一个构图中重复出现的要素建立秩序。

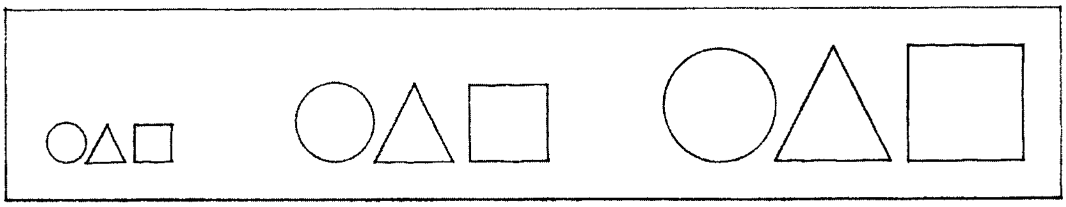


The simplest form of repetition is a linear pattern of redundant elements. Elements need not be perfectly identical, however, to be grouped in a repetitive fashion. They may merely share a common trait or a common denominator, allowing each element to be individually unique, yet belong to the same family.

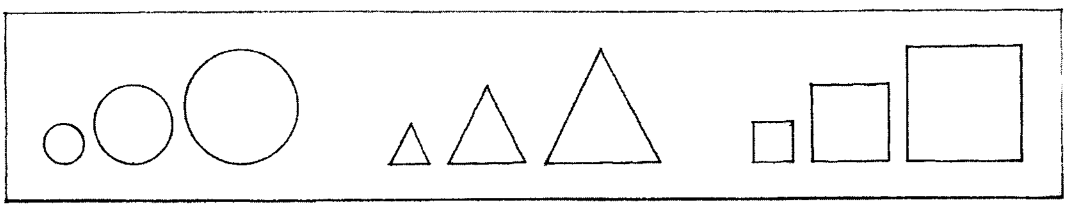
最简单的重复形式是将众多的要素排列成一个直线图案。然而这些要素不一定要完全相同才能组合出重复的式样。尽管每个要素形象各异，只要它们享有共同的性质和特征就可以归为同一类。



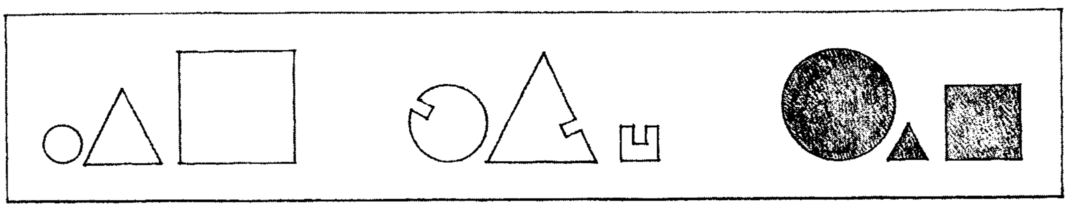
- **Size**
  尺寸



- **Shape**
  形状

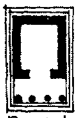


- **Detail Characteristics**
  细部特点





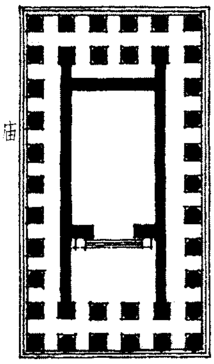
Distyle in Antis
安底斯的双柱神庙



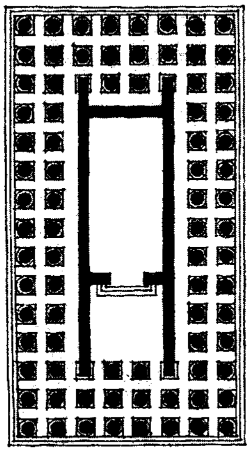
Prostyle
前柱廊式



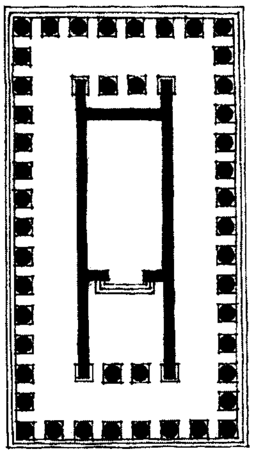
Amphiprostyle
前后柱廊式



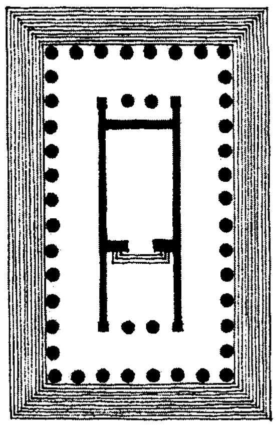
Peripteral
围柱式



Dipteral
双围柱式



Pseudodipteral
仿双廊式



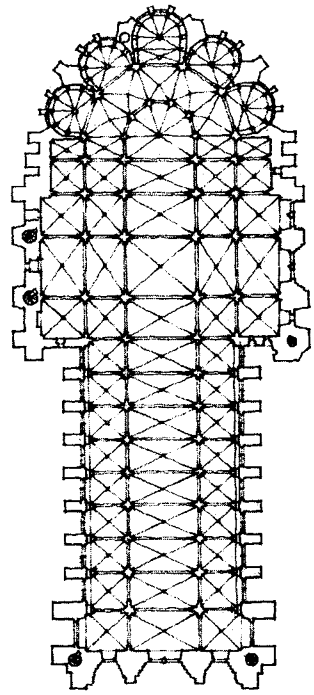
The Smitheum
斯敏索姆教堂

Classification of Temples according to the arrangements of the colonnades. From Book III, Chapter II of Vitruvius' *Ten Books on Architecture.*

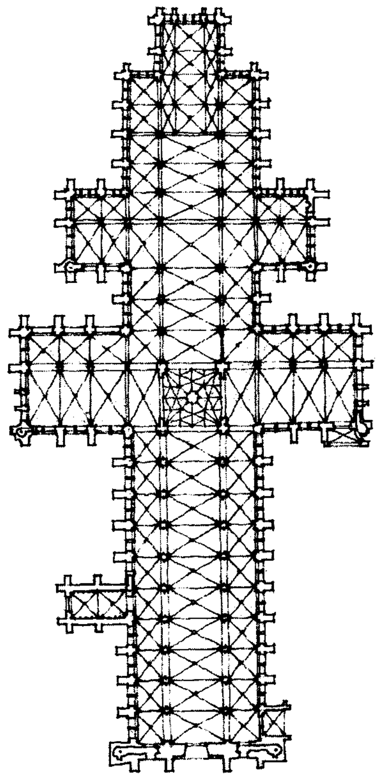
按柱廊布置**分类的神庙**，根据维特鲁威的《建筑十书》，第三卷，第二章。

Structural patterns often incorporate the repetition of vertical supports at regular or harmonious intervals which define modular bays or divisions of space. Within such repetitive patterns, the importance of a space can be emphasized by its size and placement.

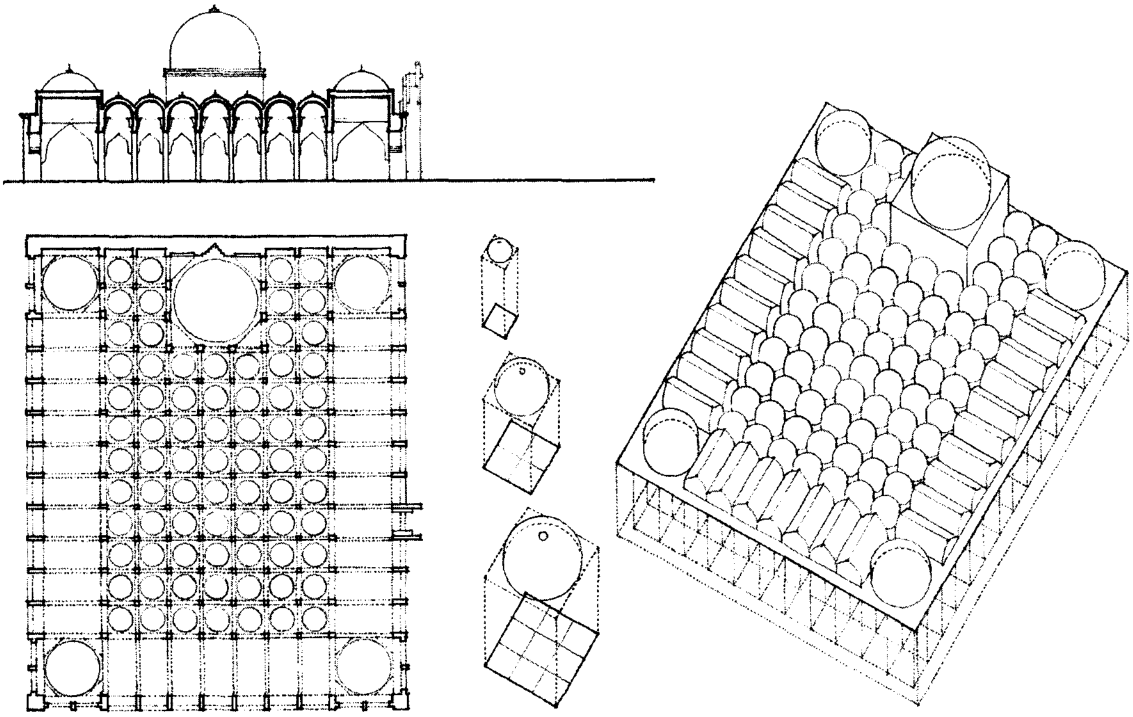
结构图案常常包括竖向支撑要素的重复，这些竖向支撑以规则的或和谐的间距出现，限定了模数化的跨距和空间区域。在这种重复的图案中可以通过尺寸和位置来强调一个空间的重要性。



Cathedral at Reims, 1211–1290
兰斯大教堂，1211年—1290年

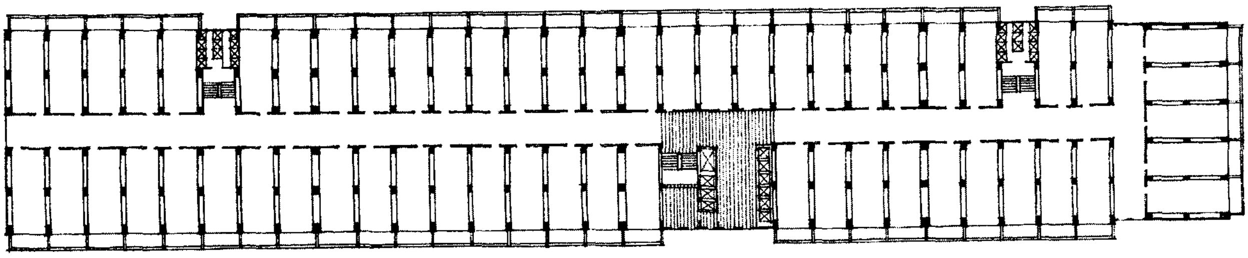


Cathedral at Salisbury, 1220–1260
索尔兹伯里大教堂，1220年—1260年



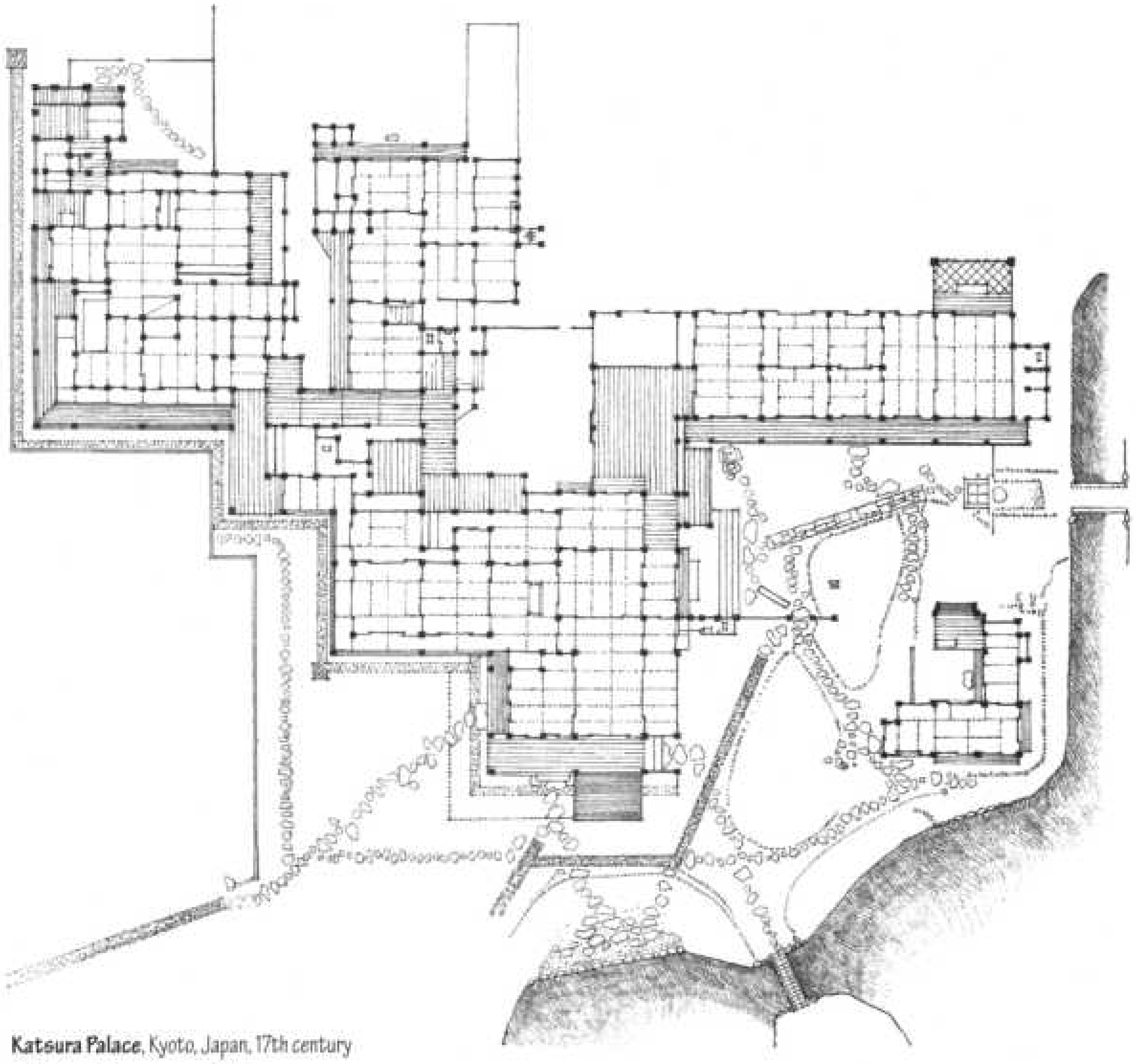
Jami Masjid, *Gulbarga, India, 1367*

J. **马西德清真寺**，古尔伯加，印度，1367年

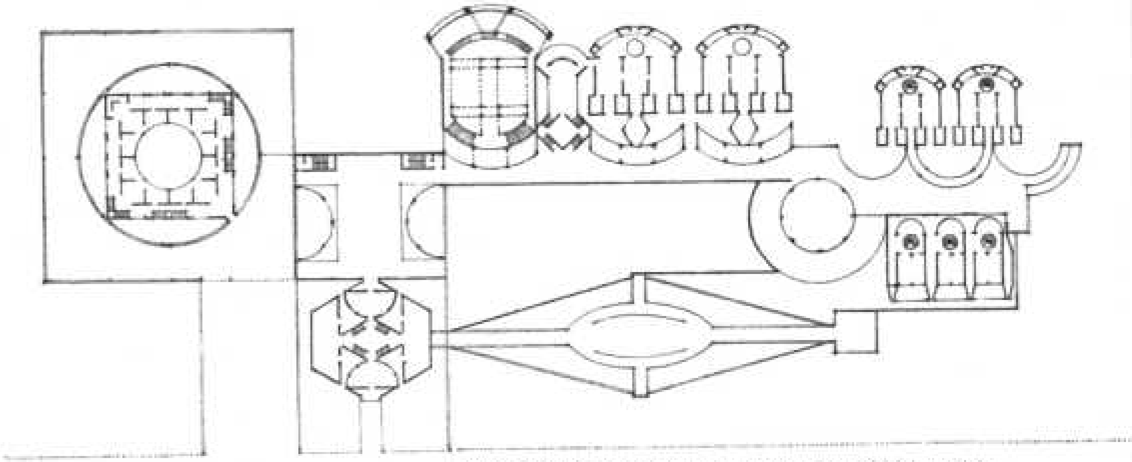


Typical Floor Plan, **Unité d'Habitation**, Marseilles, 1946–1952, Le Corbusier

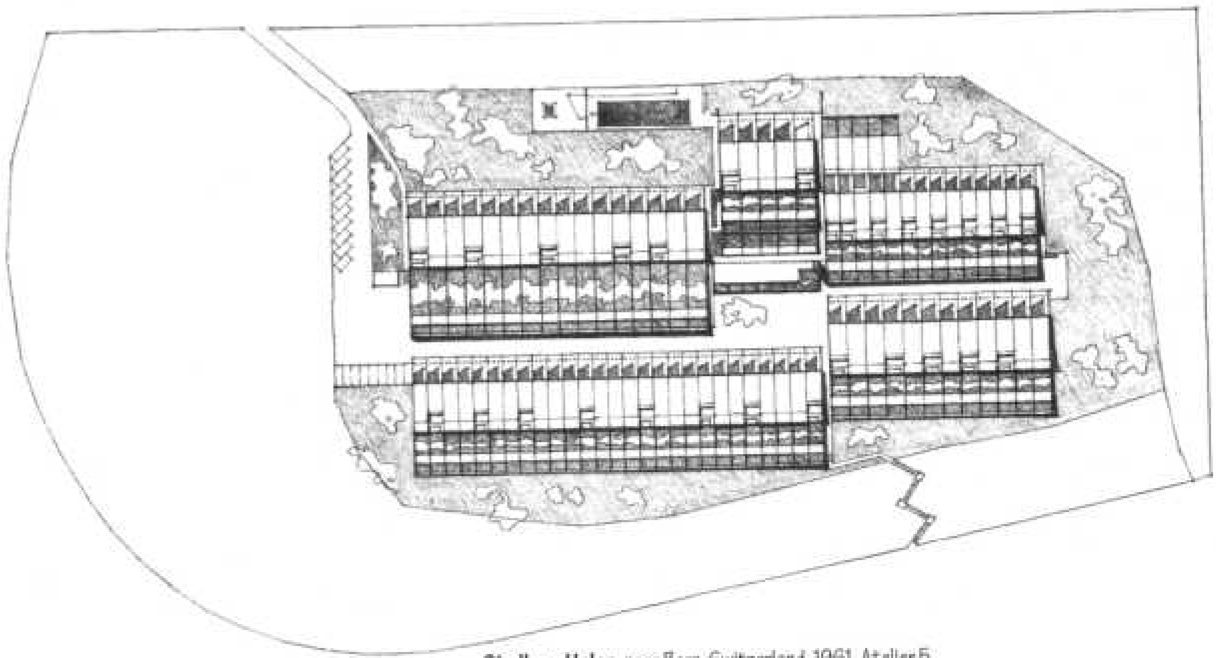
标准层平面，**公寓大楼**，马赛，1946年—1952年，勒·柯布西埃



Katsura Palace, Kyoto, Japan, 17th century
桂离宫，京都，日本，17世纪

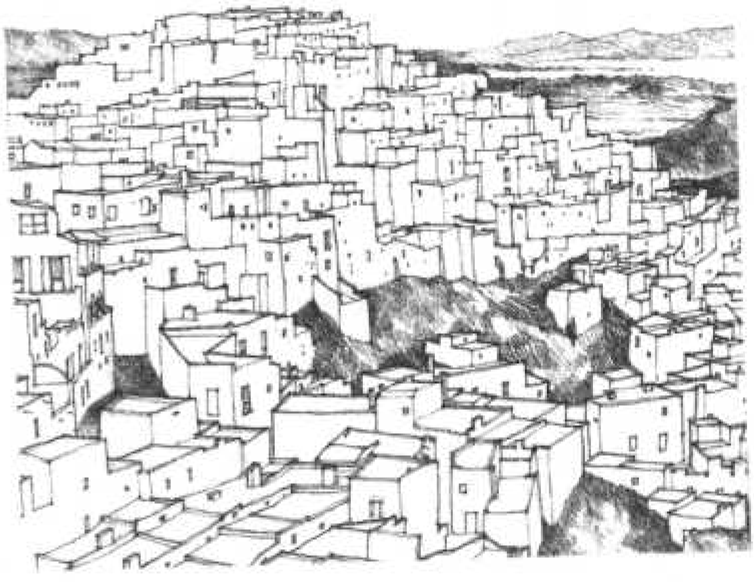


Capitol Complex (Project), **Islamabad**, Pakistan, 1965, Louis Kahn
国会大厦（方案），伊斯兰堡，巴基斯坦，1965年，L. 康



Siedlung Halen, near Bern, Switzerland, 1961, Atelier 5
塞德朗·海伦住宅、伯尔尼附近，瑞士，1961年，第5工作室

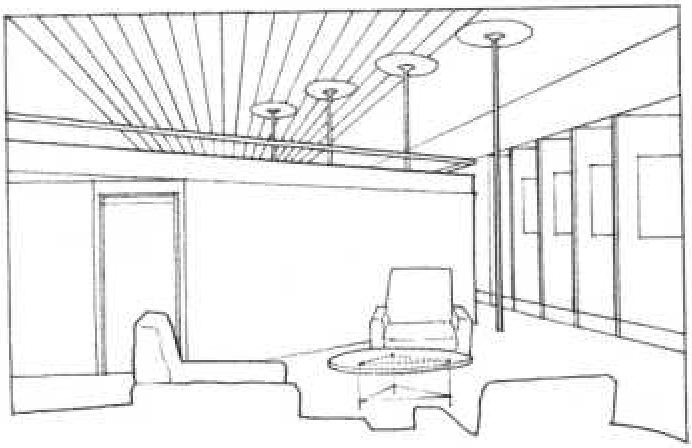
As in music, a rhythmic pattern may be legato, continuous, and flowing, or staccato and abrupt in its pace or cadence.
正如在音乐中，富有韵律的图案可能是平滑的、连贯的、流畅的，否则其速度或节奏就会不连贯而且生硬。



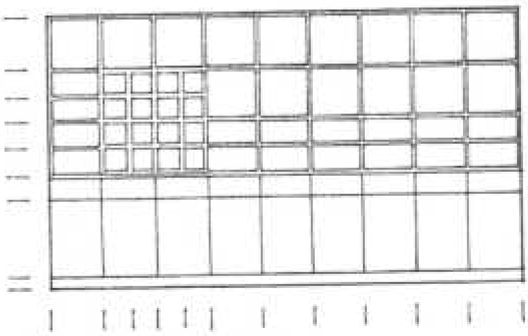
View of Spanish Hill Town of **Mojácar**
西班牙山城**莫扎卡**景象



Rhythm created by connecting points in space
由空间中的连接点产生的韵律



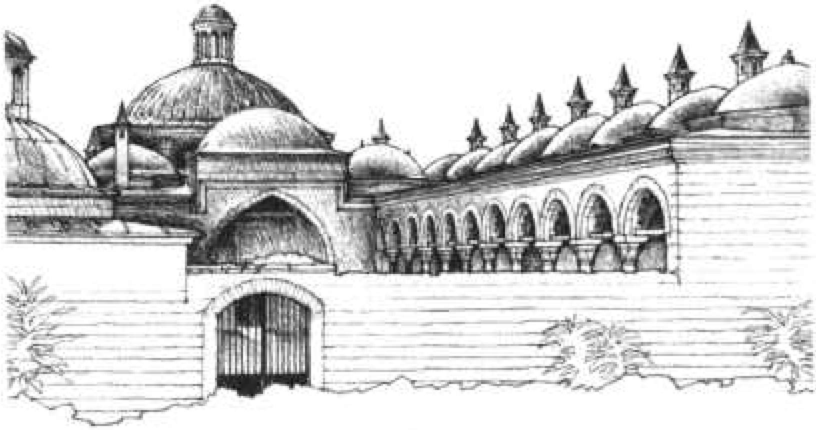
Contrasting rhythms
对比的韵律



Horizontal and vertical rhythms
水平和垂直的韵律



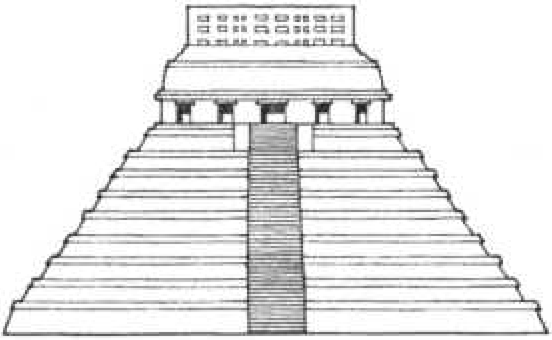
View of **Villa Hermosa**, Spain
赫莫萨山村景象，西班牙



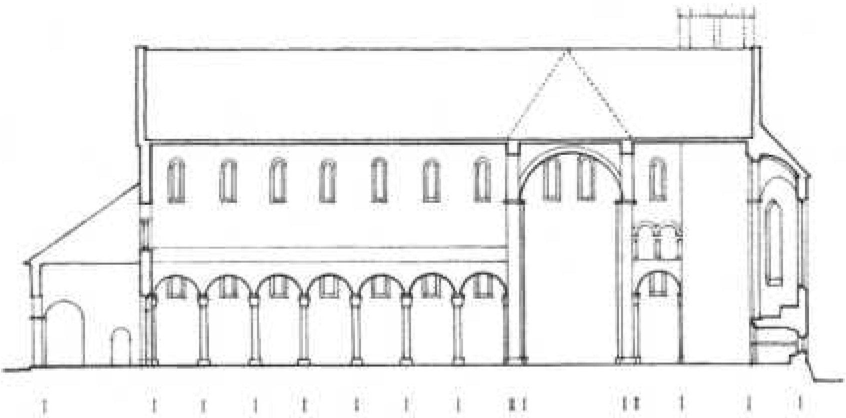
Külliye of Beyazid II, Bursa, Turkey, 1398–1403
拜亚吉德二世神庙，伯塞，土耳其，1398年—1403年

Rhythmic patterns provide continuity and lead us to anticipate what comes next. Any break in the pattern announces and emphasizes the importance of the interrupting element or interval.

富有韵律的图案提供了连续性，并引导我们预见即将到来的东西。图案中的任何中断都表明并强调了插入要素或中断区间的重要性。



Temple of the Inscriptions, Palenque, Mexico, c. A.D. 550
碑铭神庙，帕伦克，墨西哥，550年

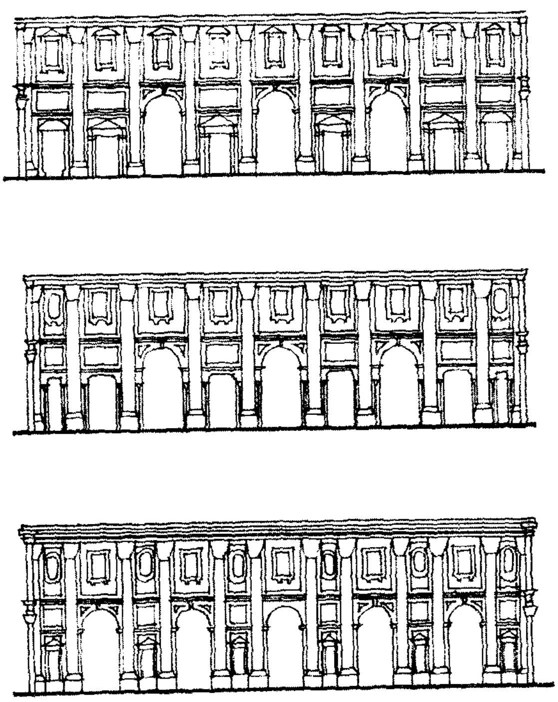


Abbey Church at Alpirsbach, Germany, c. 1000
阿尔皮斯巴赫的阿比教堂，德国，1000年



Victorian Facades Fronting a San Francisco street
朝向旧金山一条大街的**维多利亚式立面**

Multiple rhythms can be laid over one another in the facade of a building.
在一栋建筑物的立面上多种韵律可以彼此重叠。

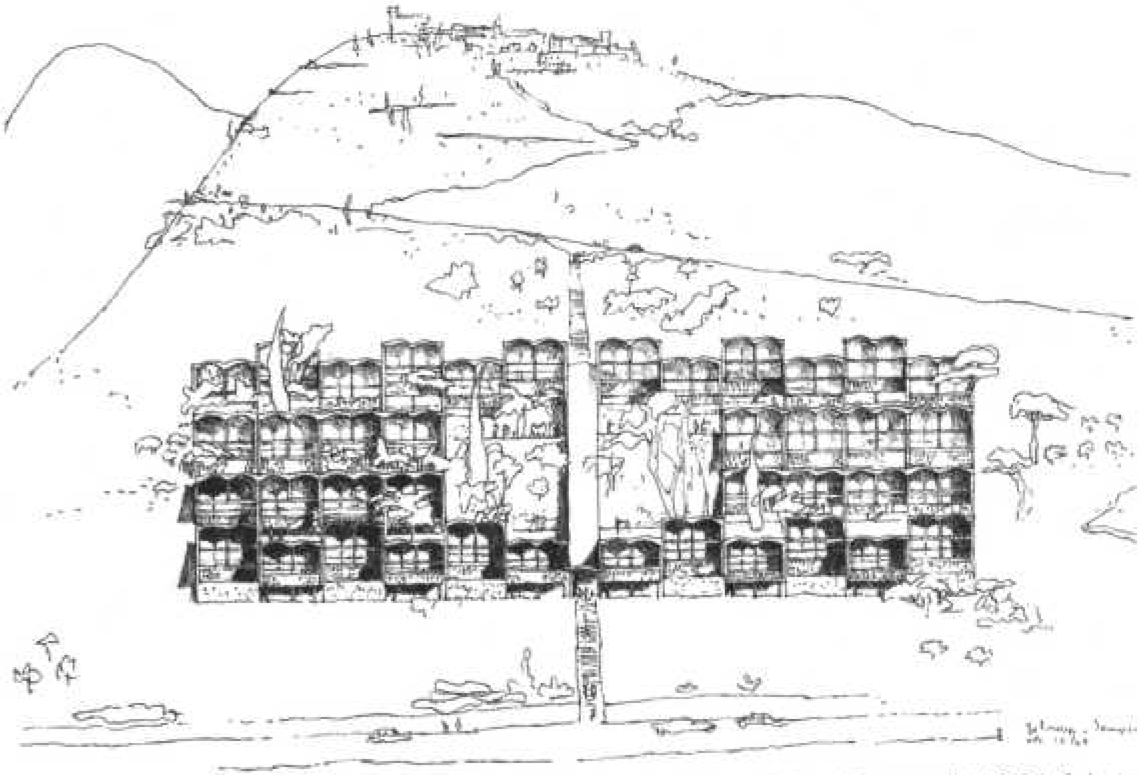


a·b·a·b·a·b·a·b·a
a·a·b·a·b·a·b·a·a
A·B·C·B·C·B·C·B·A

a·b·b·b·b·b·b·b·a
c·a·b·a·b·a·b·a·c
A·B·C·B·C·B·C·B·A

a·b·a·b·a·b·a·b·a·b·a
a·b·a·b·a·b·a·b·a·b·a
A·B·A·B·A·C·A·B·A·B·A

Studies of **Internal Facade of a Basilica** by Francesco Borromini
由博洛米尼所作的**某巴西利卡内部立面**研究

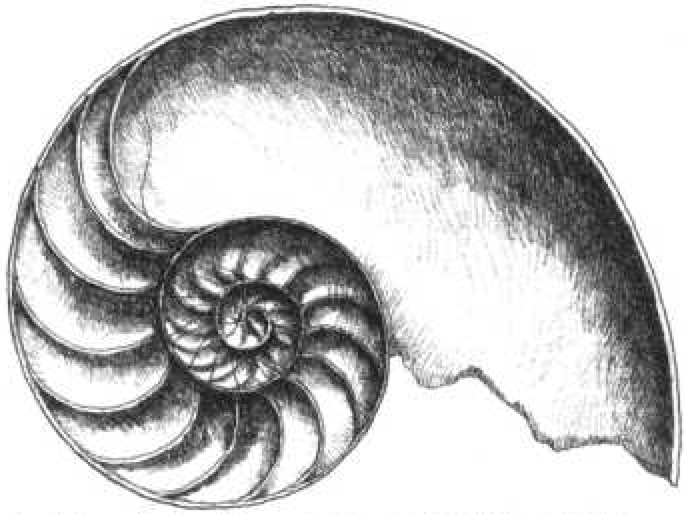


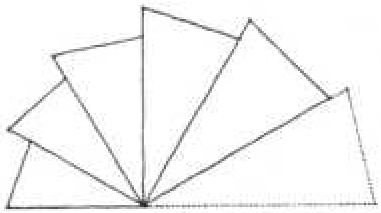
Roq Housing Project, Cap-Martin, on the French Riviera near Nice, 1949, Le Corbusier
洛克住宅方案，马丁角，尼斯附近的法属里维埃拉地区，1949年，勒·柯布西埃

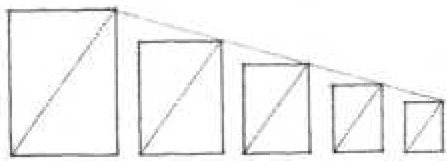
More complex rhythmic patterns can be created by introducing points of emphasis or exceptional intervals into a sequence. These accents or beats help differentiate between the major and minor themes in a composition.
可以通过在序列内部引入强调点或特别的区间来产生更为复杂的韵律图案。

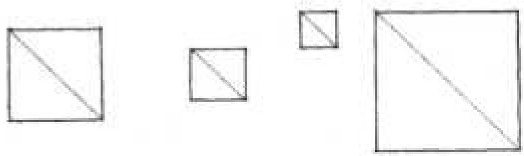


Bedford Park, London, 1875, Maurice Adams, E.W. Goodwin, E.J. May, Norman Shaw
贝德福德公园，伦敦，1875年，M. 亚当斯，E. W. 古德温，E. J. 梅，N. 肖









The radial segments of a nautilus shell spiral outward in a reverberating manner from its center and maintain the shell's organic unity through this pattern of additive growth. Using the mathematical ratio of the Golden Section, a series of rectangles can be generated to form a unified organization wherein each rectangle is proportionate to the others as well as to the overall structure. In each of these examples, the principle of reverberation creates a sense of order among a group of elements which are similar in shape but hierarchically graded in size.

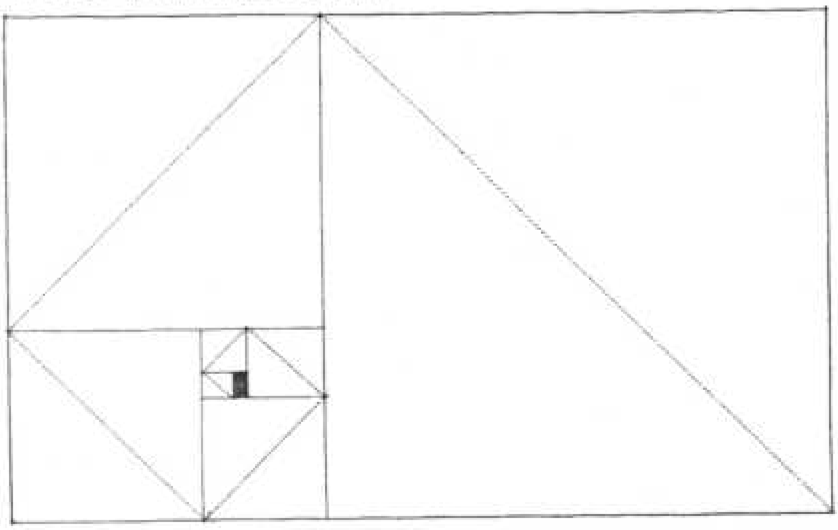
鹦鹉螺的放射状部分以反射方式从中心点向外作螺旋扩展，并在扩展图案中保持着壳体的有机统一性。运用黄金分割的数学比，可以产生一系列矩形来形成一个统一的组合。在这一组合中，各矩形之间以及矩形与整体结构之间都是成比例的。在这些例子中，反射扩展的原理能在一组形状相同而尺寸有等级差别的要素中产生秩序感。

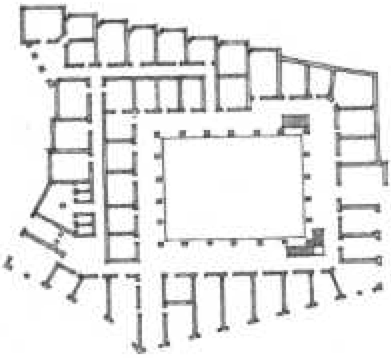
Progressive, reverberating patterns of forms and spaces can be organized in the following ways:

- in a radial or concentric manner about a point
- sequentially according to size in a linear fashion
- randomly but related by proximity as well as similarity of form

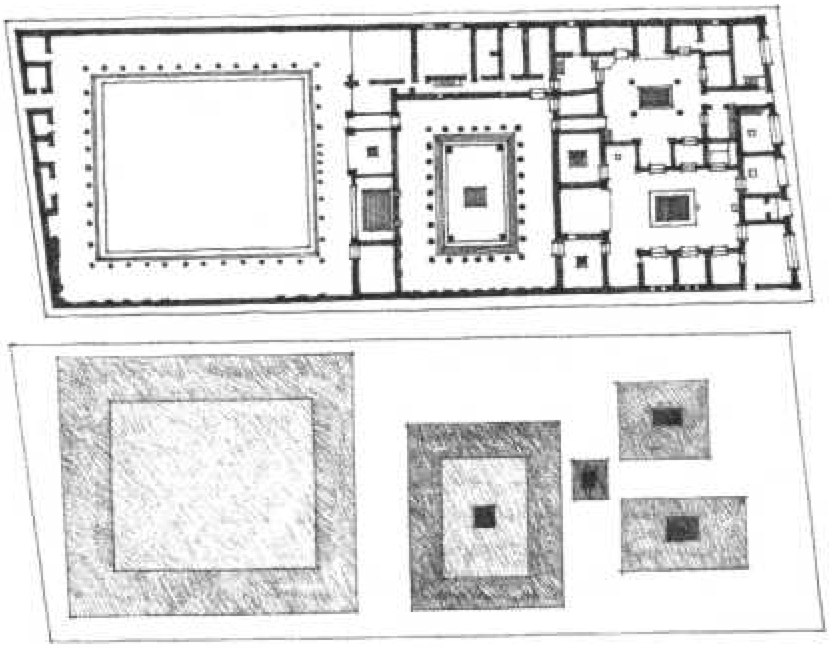
进一步推论，形式与空间的反射图案，可以下列方式进行组合：

- 围绕一个点呈放射状或同心圆状
- 按尺寸形成一个线式序列
- 任意组合，但以形式相同且接近相联系

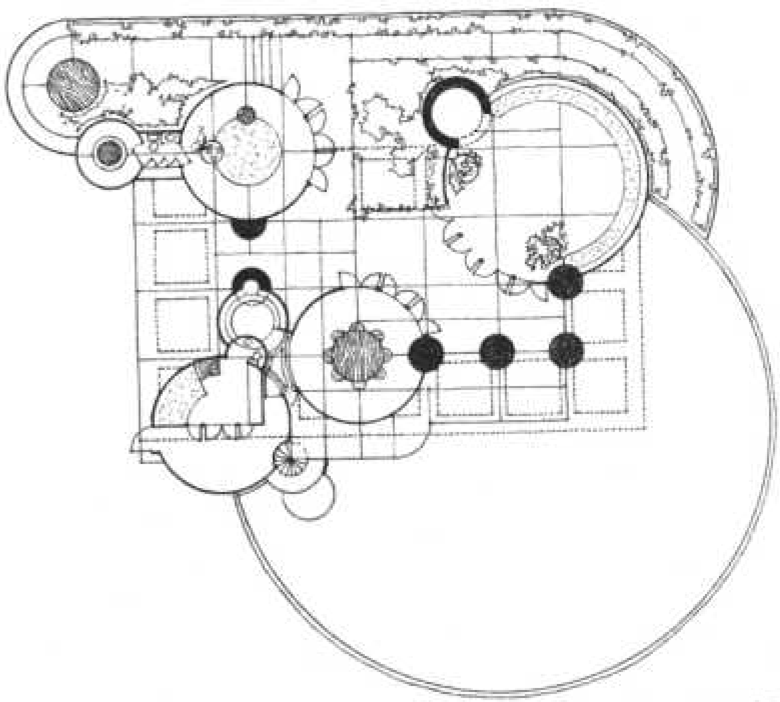




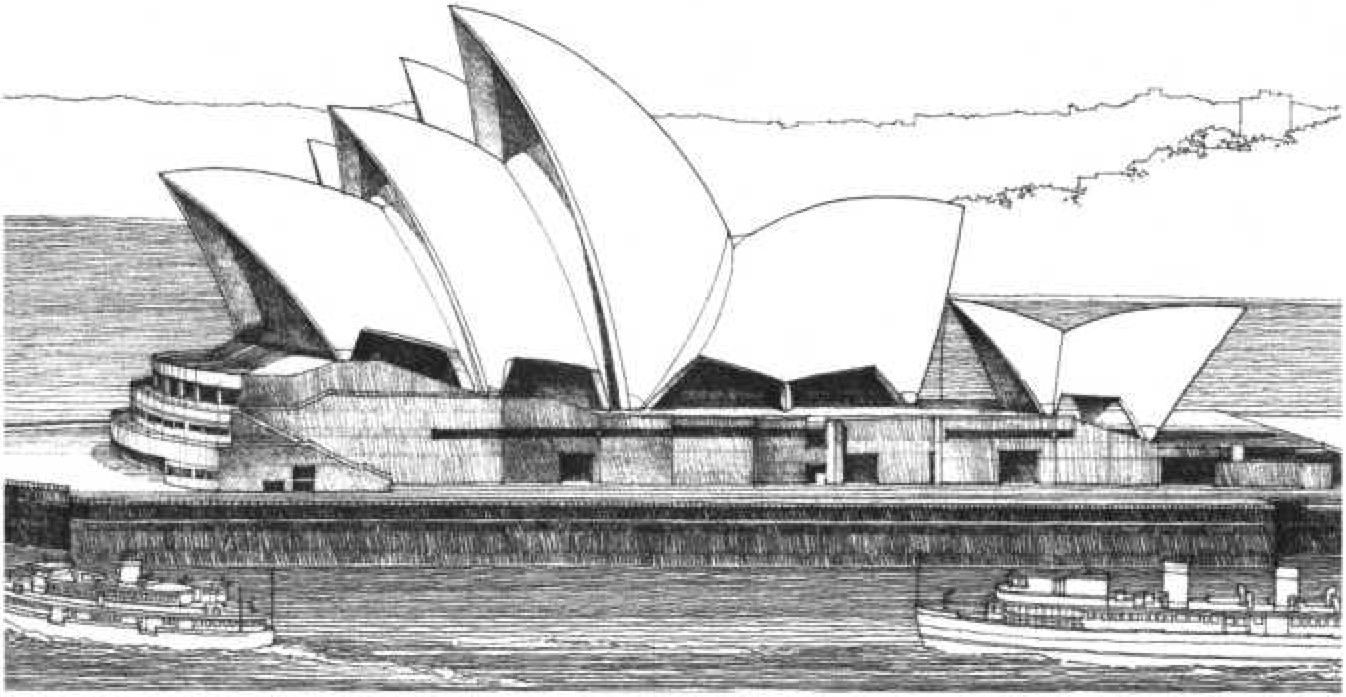
Hasan Pasha Han, Istanbul, 14th century
哈桑·巴萨罕，伊斯坦布尔，14世纪



House of the Faun, Pompeii, c. 2nd century B.C.
农牧神殿，庞培，公元前2世纪

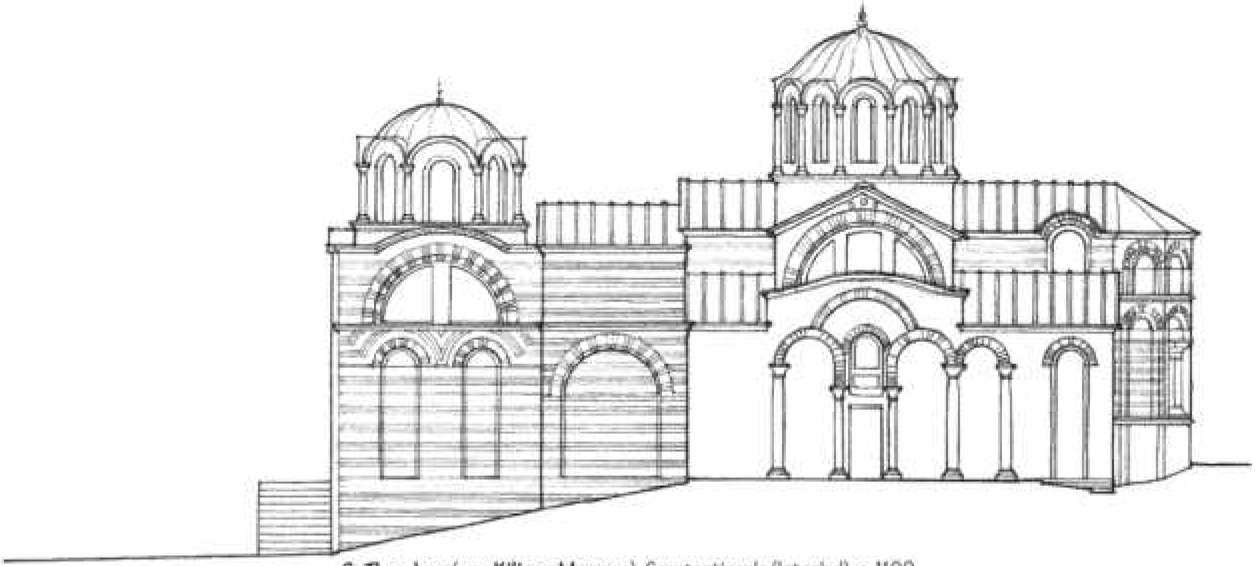


Jester House (Project), Palos Verdes, California, 1938, Frank Lloyd Wright
杰斯特住宅（方案），帕洛斯弗迪斯，加利福尼亚州，1938年，F. L. 莱特



Sydney Opera House, Sydney, Australia, *designed* 1957, *completed* 1973, Jorn Utzon

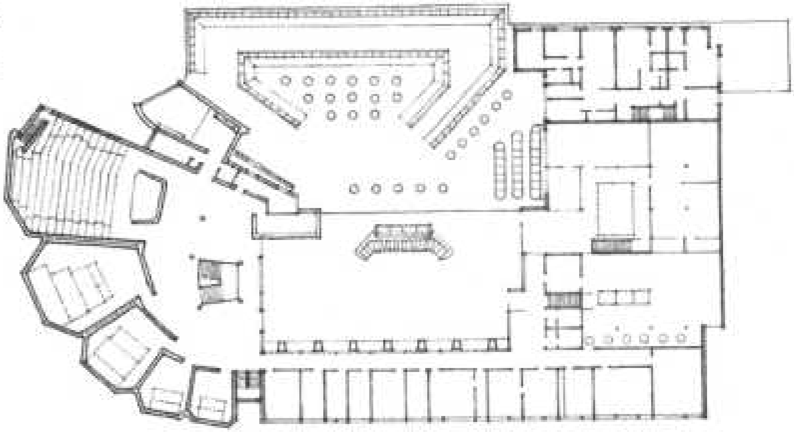
悉尼歌剧院，悉尼，澳大利亚，1957年设计，1973年完工，J. 伍重



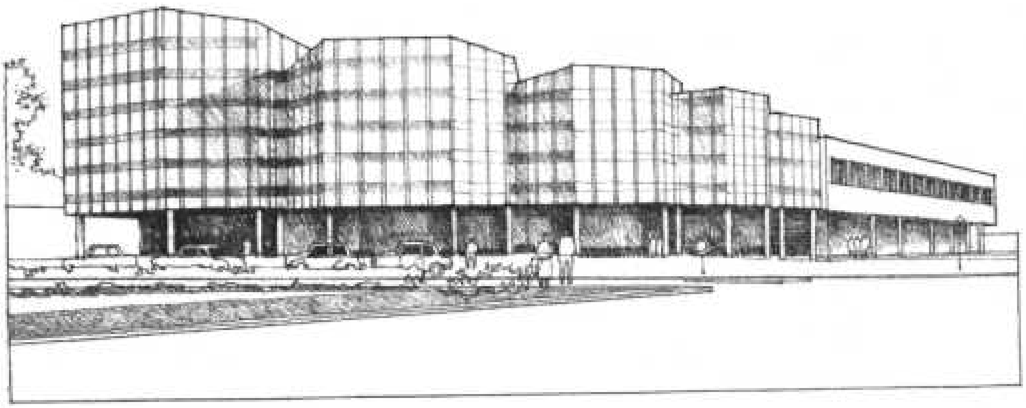
S. Theodore (now **Kilisse Mosque**), *Constantinople (Istanbul), c.* 1100

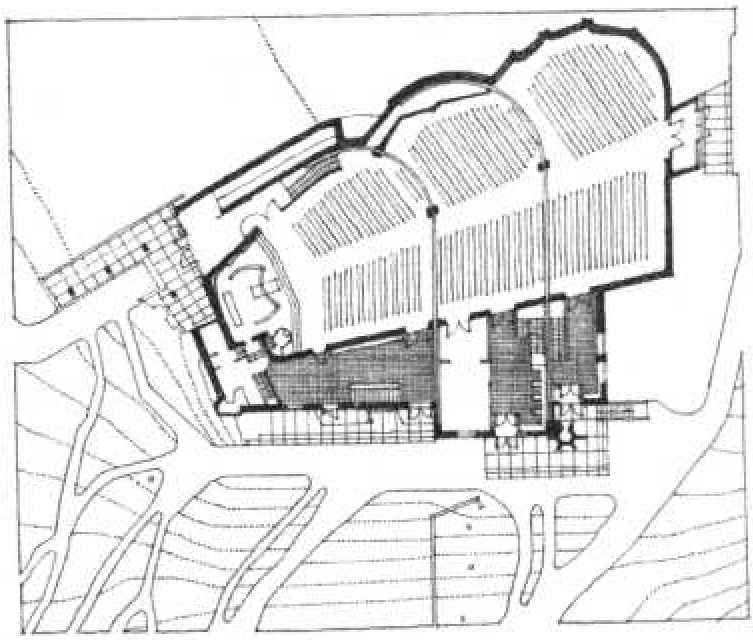
圣·西奥多（现为基里斯清真寺），君士坦丁堡（伊斯坦布尔），1100年

Cultural Center, Wolfsburg, Germany, 1948–1962, Alvar Aalto
文化中心，沃尔夫斯堡，德国，1948年—1962年，A. 阿尔托

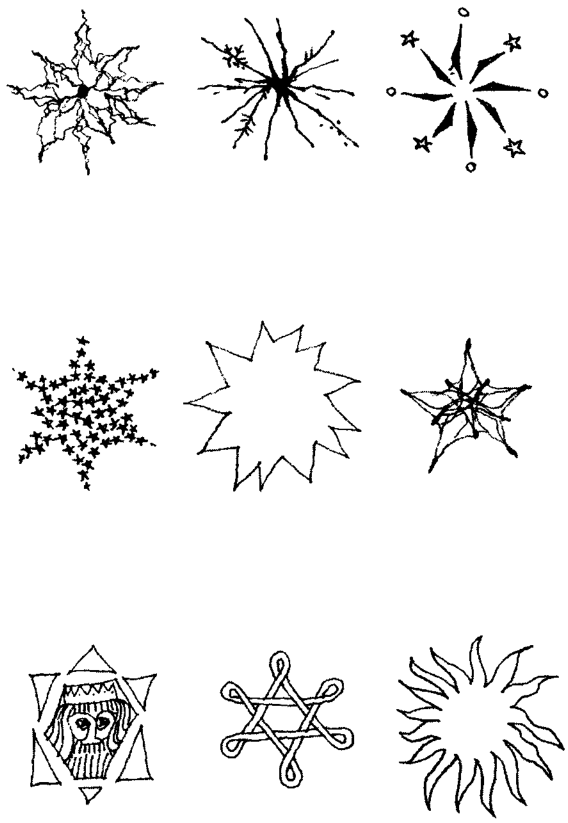


Plan
平面





Church at Vuoksenniska, Finland, 1956, Alvar Aalto
沃克辛尼斯卡教堂，芬兰，1956年，A. 阿尔托



The study of architecture, as with other disciplines, should legitimately involve the study of its past, of prior experiences, endeavors, and accomplishments from which much can be learned and emulated. The principle of transformation accepts this notion; this book, and all of the examples it contains, is predicated on it.

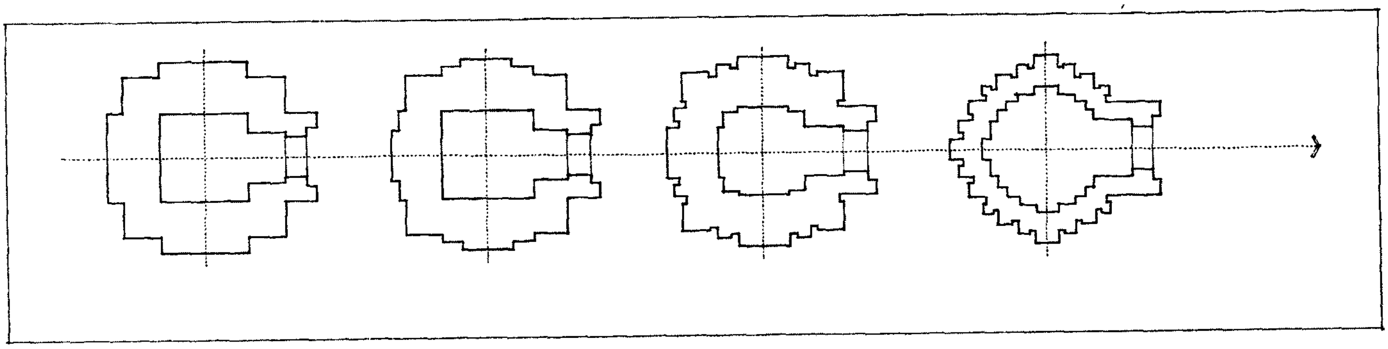
研究建筑学与研究其他学科一样，应该正规地研究它的历史，研究前人的经验、他们的努力和取得的成就，从中我们可以学习和借鉴到许多东西。变换原理接受以上观点。本书及书中的所有实例都是基于这个出发点的。

The principle of transformation allows a designer to select a prototypical architectural model whose formal structure and ordering of elements might be appropriate and reasonable, and to transform it through a series of discrete manipulations in order to respond to the specific conditions and context of the design task at hand.

但是，变换原理允许设计者选择一个其形式结构及要素秩序都是合理适当的典型建筑模式，通过一系列的具体处理，将其变换成符合当时的实际情况和周围环境的建筑设计。

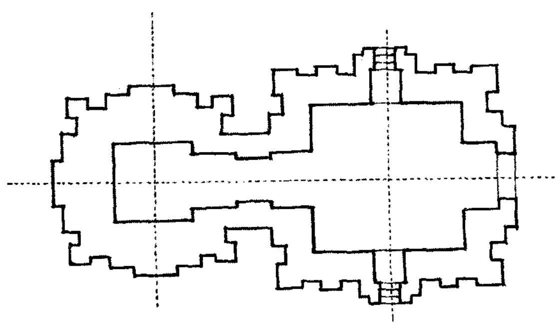
Design is a generative process of analysis and synthesis, of trial and error, of trying out possibilities and seizing opportunities. In the process of exploring an idea and probing its potential, it is essential that a designer understand the fundamental nature and structure of the concept. If the ordering system of a prototypical model is perceived and understood, then the original design concept can, through a series of finite permutations, be clarified, strengthened, and built upon, rather than destroyed.

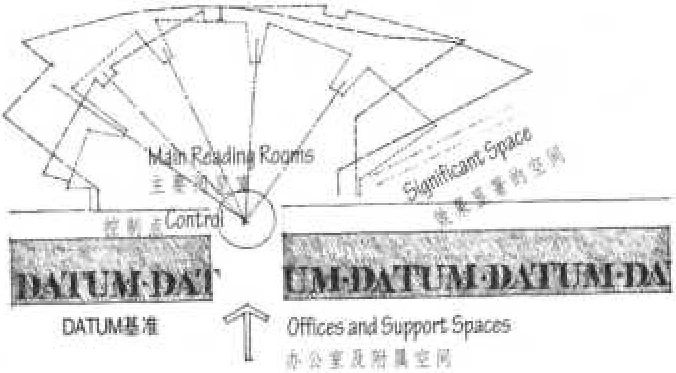
设计是一个分析与综合的生成过程，是一个反复试验的过程，是一个提炼可能性与抓住机会的过程。在寻找一个概念并探索其可能性的过程中，设计者理解概念的基本特点和结构是非常重要的。如果典型模式的秩序体系能够被感知和理解，那么通过一系列有限的置换，最初的设计概念能够被明确、加强并以此为基础进行建设，而不是将它毁掉。



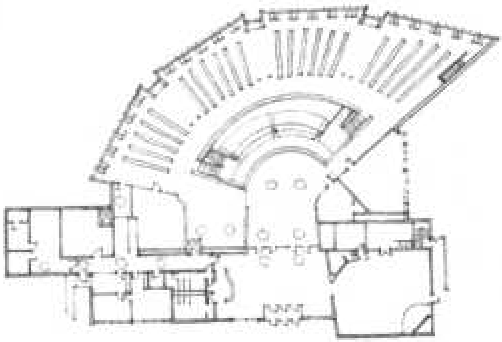
Plan Development of the **North Indian Cella**

北印第安内殿平面的发展变化

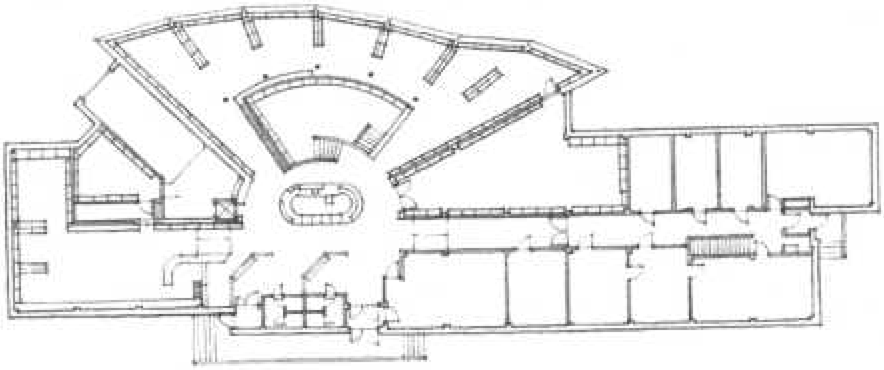




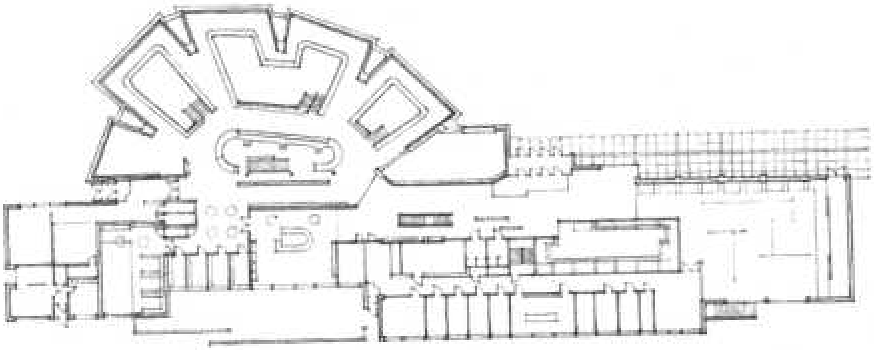
Scheme for 3 libraries by Alvar Aalto
A. 阿尔托设计的三个图书馆方案



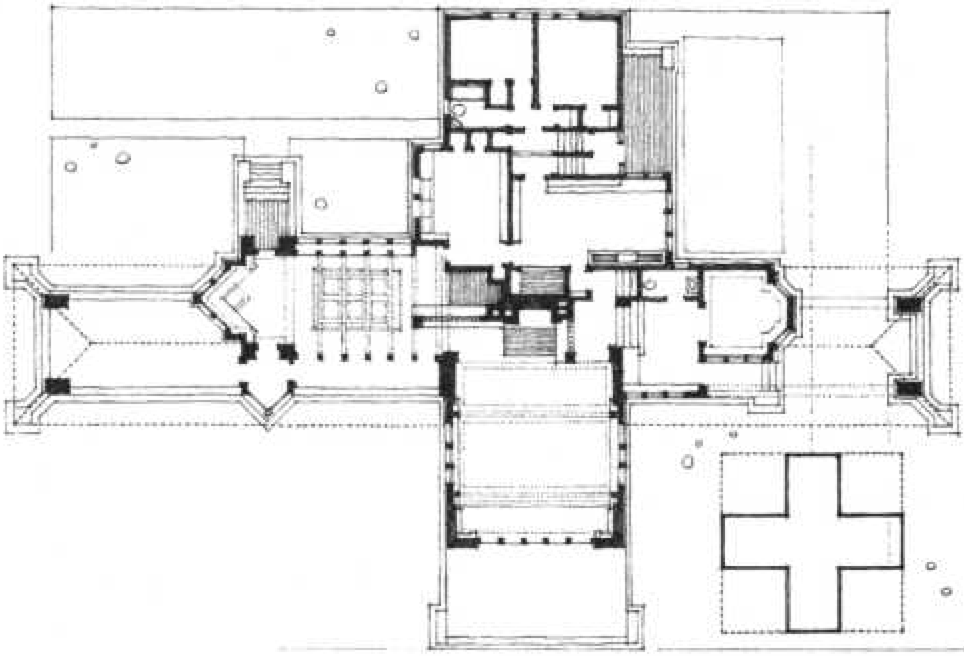
Library of Mount Angel, Benedictine College, Mount Angel, Oregon, 1965–1970
天使山图书馆，本尼迪克特学院，天使山，俄勒冈州，1965年—1970年



Library, Seinäjoki, Finland, 1963–1965
图书馆，塞纳约基，芬兰，1963年—1965年

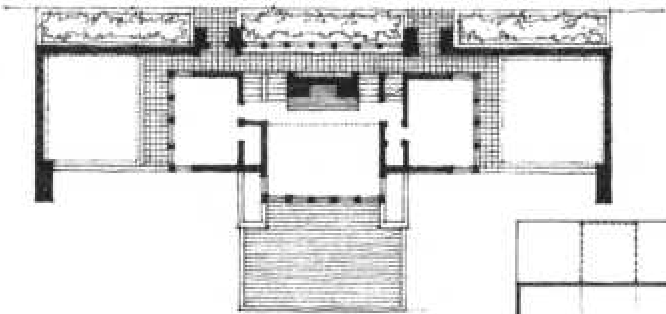


Library, Rovaniemi, Finland, 1965–1968
图书馆，洛瓦涅米，芬兰，1965年—1968年

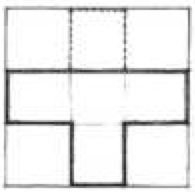


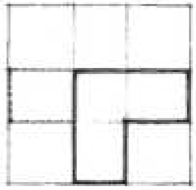
Ward Willetts House, Highland Park, Illinois, 1902
W. 威利兹住宅，海兰公园，伊利诺斯州，1902年

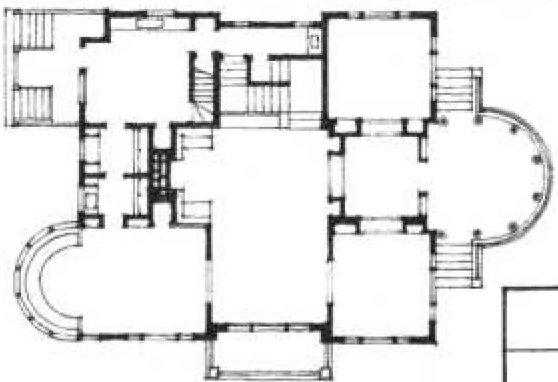
Transformation of a **Cruciform Plan Organization** by Frank Lloyd Wright
F. L.莱特所作的十字形平面组合的变换

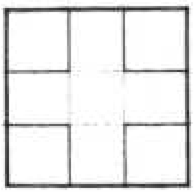


Thomas Hardy House, Racine, Wisconsin, 1905
T. 哈代住宅，拉辛，威斯康星州，1905年

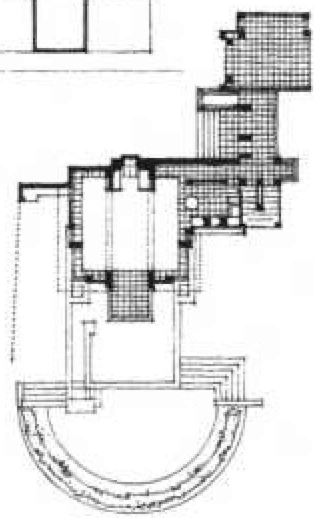








George Blossom House, Chicago, Illinois, 1882
G. 伯洛索姆住宅，芝加哥，伊利诺斯州，1882年

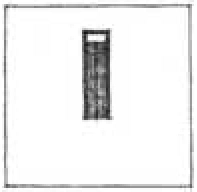


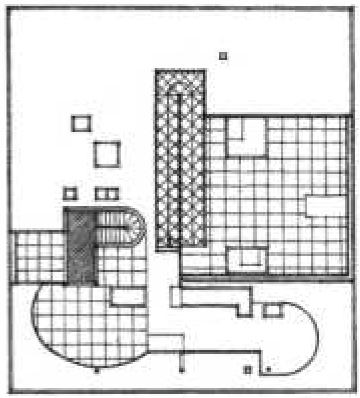
Samuel Freeman House, Los Angeles, California, 1924
S. 弗里曼住宅，洛杉矶，加利福尼亚州，1924年

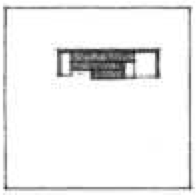


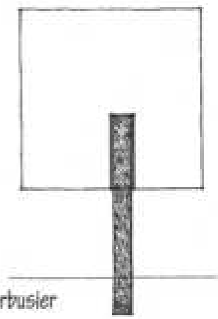
Museum of Western Art, Tokyo, 1957–1959
西方艺术博物馆，东京，1957年—1959年

Villa Savoye, Poissy, France, 1928–1931
萨伏伊别墅，普瓦西，法国，1928年—1931年

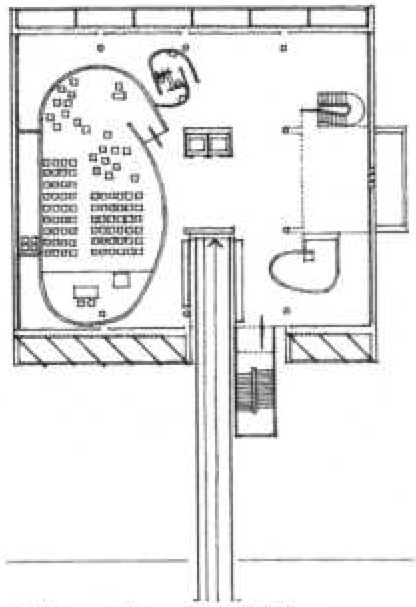




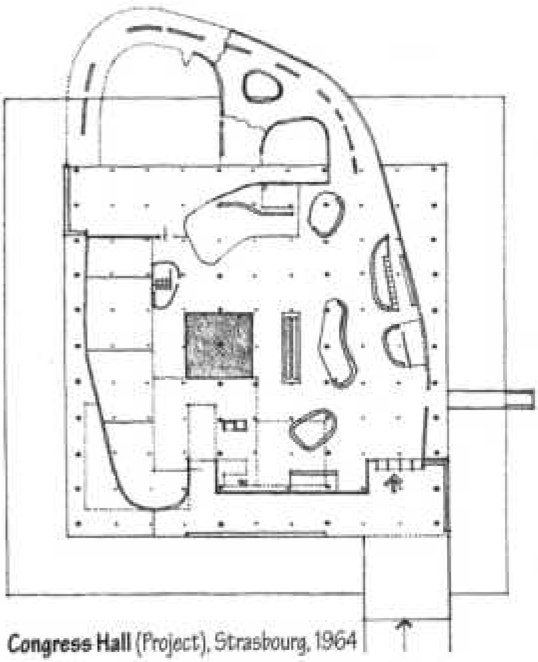




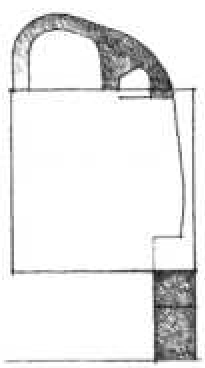
Transformation of a Free-Plan Organization, **the Ramp-in-a-Square**, by Le Corbusier
自由平面组合的变换，**方形中的坡道**，勒·柯布西埃

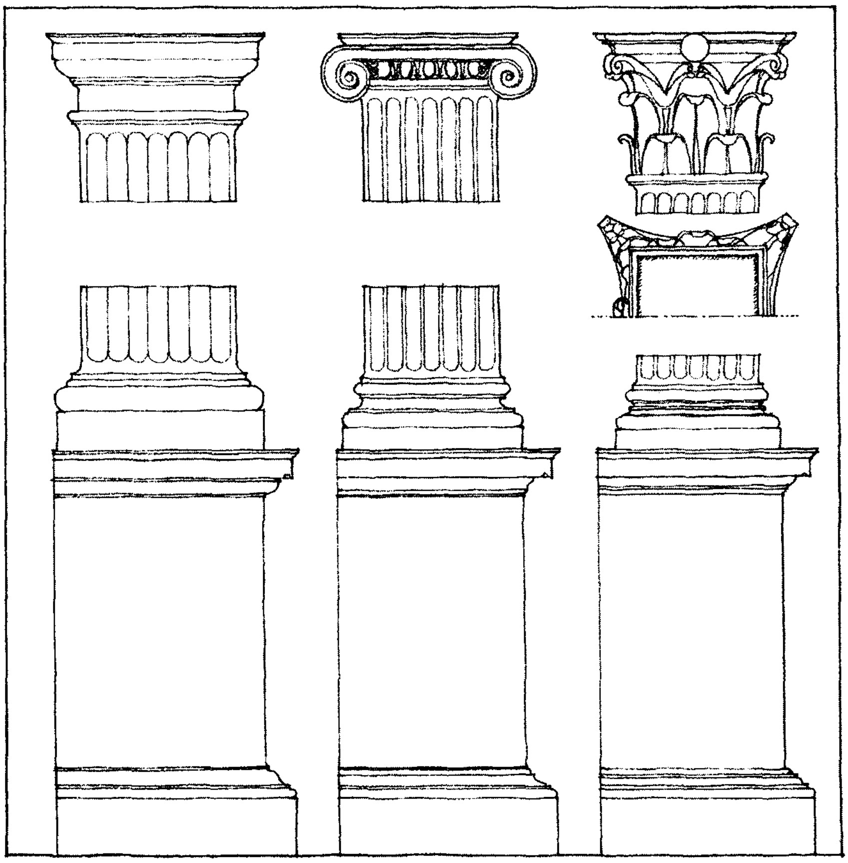


Millowners' Association Building, Ahmedabad, India, 1954
纺织实业家协会大厦，艾哈迈达巴德，印度，1954年



Congress Hall (Project), Strasbourg, 1964
议会大厅（方案），斯特拉斯堡，1964年





Meaning in Architecture
建筑中心含义

This book, throughout its presentation of the elements of form and space, has been concerned primarily with the visual aspects of their physical reality in architecture. Points, moving through space and defining lines, lines defining planes, planes defining volumes of form and space. Beyond these visual functions, these elements, by their relationships to one another and the nature of their organization, also communicate notions of domain and place, entry and path of movement, hierarchy and order. These are presented as the literal, denotative meanings of form and space in architecture.

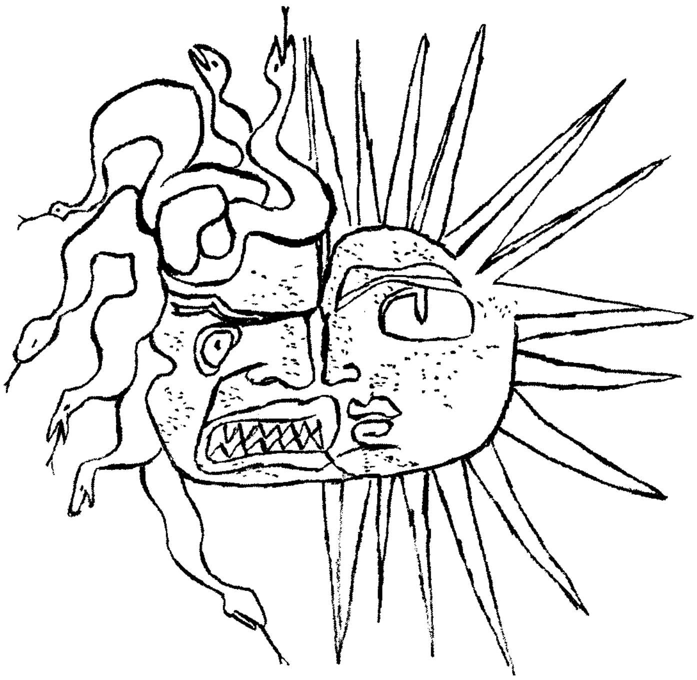
通过对形式与空间要素的介绍，本书主要关注的是，这些要素的物质实体在建筑中的视觉效果。点在空间里移动确定了线，线确定面，面则确定了形式和空间的容积。由于相互间的关系和组合的性质，这些要素除具有视觉方面的作用之外，还表达了领域与场所、入口与运动轨迹、等级与秩序等概念。这些都体现为建筑形式与空间所表达的朴实而特殊的意义。

As in language, however, architectural forms and spaces also have connotative meanings: associative values and symbolic content that are subject to personal and cultural interpretation, which can change with time. The spires of a Gothic cathedral can stand for the realm, values, or goals of Christianity. The Greek column can convey the notion of democracy, or, as in America in the early 19th century, the presence of civilization in a new world.

但是正如语言一样，建筑的形式和空间还具有它的内在含义——联想的价值和象征的内容。由于这些内在含义受到人为的解释和文化影响的支配，因此会随着时代的更替而不断变化。可以说，哥特式教堂的尖塔代表了基督教王国的价值和目标；希腊的廊柱表达了民主的观念；也可以说，19世纪初期的美国体现了一个新世界的文明。

Although the study of connotative meanings, of semiotics and symbology in architecture, is beyond the scope of this book, it should be noted here that architecture, in combining form and space into a single essence, not only facilitates purpose but communicates meaning. The art of architecture makes our existence not only visible but meaningful.

虽然建筑的内在含义、建筑的符号和象征意义不在本书的研究范围之内，但在此应该指出，建筑的形式和空间结合为一个统一体，不仅为了实现它的使用目的，同时还表达了某种意境。建筑艺术将使我们的生活不仅显而易见而且含义丰富。



"You employ stone, wood, and concrete, and with these materials you build house and palaces. That is construction. Ingenuity is at work.

But suddenly, you touch my heart, you do me good. I am happy and I say: 'This is beautiful.' That is architecture. Art enters in.

My house is practical. I thank you, as I might thank Railway engineers, or the Telephone service. You have not touched my heart.

But suppose that walls rise toward heaven in such a way that I am moved. I perceive your intentions. Your mood has been gentle, brutal, charming, or noble. The stones you have erected tell me so. You fix me to the place and my eyes regard it. They behold something which expresses a thought. A thought which reveals itself without wood or sound, but solely by means of shapes which stand in a certain relationship to one another. These shapes are such that they are clearly revealed in light. The relationships between them have not necessarily any reference to what is practical or descriptive. They are a mathematical creation of our mind. They are the language of Architecture. By the use of raw materials and starting from conditions more or less utilitarian, you have established certain relationships which have aroused my emotions. This is Architecture."

Le Corbusier
Towards a New Architecture
1927

"你使用石头、木头和水泥这些材料来建造房子和宫殿。这就是建造。人的智慧由此开始工作。

"但是，突然间你触动了我的心，你给我做得好，我感到愉快。我说：'这多美啊。'这就是建筑，艺术由此而入。

"我的房子是实用的。我感谢你，正像我感谢铁路工程师和电话公司一样，但是你们没有触动我的心。

"如果以这样一种方式，让墙壁冲天而起，我会感动。我理解了你的意图。你的情绪是温和的，是激烈的，是迷人的或是崇高的。你树立起来的石头会这样告诉我。你把我安置在某个场所，我的眼睛会审视它。眼睛会抓住表达某种思想的东西。这种思想并非材料和声音所能表达，而仅仅是通过形状彼此之间的相互关系来表达。这些形状一览无余地暴露在光线之下。它们之间的关系不必与实用或图形的要求有任何牵连。它们是我们头脑中的数学创造。它们是建筑的语言。使用某些原材料，从或多或少的功能条件开始，你就能建立起某种触动我感情的关系，这就是建筑。"

勒·柯布西埃
《走向新建筑》
1927年

acropolis The fortified high area or citadel of an ancient Greek city, esp. the citadel of Athens and site of the Parthenon.

aedicule A canopied opening or niche flanked by two columns, piers, or pilasters supporting a gable, lintel, or entablature.

agora A marketplace or public square in an ancient Greek city, usually surrounded with public buildings and porticoes and commonly used as a place for popular or political assembly.

allée French term for a narrow passage between houses, or a broad walk planted with trees.

anomaly A deviation from the normal or expected form, order, or arrangement.

anthropology The science of human beings: specif. the study of the origins, physical and cultural development, and environmental and social relations of humankind.

anthropometry The measurement and study of the size and proportions of the human body.

anthropomorphism A conception or representation resembling the human form or having human attributes.

apse A semicircular or polygonal projection of a building, usually vaulted and used esp. at the sanctuary or east end of a church.

arbor A shady shelter of shrubs and branches or of latticework intertwined with climbing vines and flowers.

arcade A series of arches supported on piers or columns. Also, an arched, roofed gallery or passageway with shops on one or both sides.

arch A curved structure for spanning an opening, designed to support a vertical load primarily by axial compression.

architrave The lowermost division of a classical entablature, resting directly on the column capitals and supporting the frieze.

atrium Originally, the main or central inner hall of an ancient Roman house, open to the sky at the center and usually having a pool for the collection of rainwater. Later, the forecourt of an early Christian church, flanked or surrounded by porticoes. Now, an open, skylit court around which a house or building is built.

axis A central line that bisects a two-dimensional body or figure or about which a three-dimensional body or figure is symmetrical. Also, a straight line to which elements in a composition are referred for measurement or symmetry.

background The part of an image represented as being at the maximum distance from the frontal plane.

balance A state of equilibrium between contrasting, opposing, or interacting elements. Also, the pleasing or harmonious arrangement or proportion of parts or elements in a design or composition.

balcony An elevated platform projecting from the wall of a building and enclosed by a railing or parapet.

baldachin An ornamental canopy of stone or marble permanently placed over the high altar in a church.

base The lowermost portion of a wall, column, pier, or other structure, usually distinctively treated and considered as an architectural unit.

basilica A large oblong building used as a hall of justice and public meeting place in ancient Rome, typically having a high central space lit by a clerestory and covered by timber trusses, and a raised dais in a semi-circular apse for the tribunal. The Roman basilica served as a model for early Christian basilicas, which were characterized by a long, rectangular plan, a high colonnaded nave lit by a clerestory and covered by a timbered gable roof, two or four lower side aisles, a semicircular apse at the end, a narthex, and often other features, as an atrium, a bema, and small semicircular apses terminating the aisles.

bay A major spatial division, usually one of a series, marked or partitioned off by the principal vertical supports of a structure. Also, any of a number of principal compartments or divisions of a wall, roof, or other part of a building marked off by vertical or transverse supports.

beam A rigid structural member designed to carry and transfer transverse loads across space to supporting elements.

bearing wall A wall capable of supporting an imposed load, as from a floor or roof of a building.

belvedere A building, or architectural feature of a building, designed and situated to look out upon a pleasing scene.

bema A transverse open space separating the nave and the apse of an early Christian church, developing into the transept of later cruciform churches.

berm A bank of earth placed against one or more exterior walls of a building as protection against extremes in temperature.

bosket A grove or thicket of trees in a garden or park.

brise-soleil A screen, usually of louvers, placed on the outside of a building to shield the windows from direct sunlight.

campanile A bell tower, usually one near but not attached to the body of a church.

cantilever A beam or other rigid structural member extending beyond a fulcrum and supported by a balancing member or a downward force behind the fulcrum.

capital The distinctively treated upper end of a column, pillar, or pier, crowning the shaft and taking the weight of the entablature or architrave.

caravansary An inn in the Near East for the overnight accommodation of caravans, usually having a large courtyard enclosed by a solid wall and entered through an imposing gateway.

caryatid A sculptured female figure used as a column.

cathedral The principal church of a diocese, containing the bishop's throne called the cathedra.

ceiling The overhead interior surface or lining of a room, often concealing the underside of the floor or roof above.

cenotaph A monument erected in memory of a deceased person whose remains are buried elsewhere.

chaitya A Buddhist shrine in India, usually carved out of solid rock on a hillside, having the form of an aisled basilica with a stupa at one end.

卫城（acropolis） 古希腊城市内的设防高地或堡垒，特别是雅典的城堡和帕提侬神庙所在的位置。

神龛（aedicule） 一个带有顶棚的洞口或凹进空间，侧面有两根柱子、墩子或壁柱支撑着山墙、过梁和柱顶。

集市、广场（agora） 古希腊城市中的市场或公共广场，一般情况下，周边是公共建筑和柱廊，通常用作公众集会或政治集会的场所。

小径（allée） 法文单词，指房屋之间狭窄的通道，或者种植着树木的宽阔步道。

异常（anomaly） 不同于正常的或预想的形式、秩序或排列。

人类学（anthropology） 关于人类的科学，特别是研究人类的起源、身体与文化的演进，以及人类的环境与社会关系。

人体测量学（anthropometry） 度量和研究人体的尺寸和比例。

拟人论（anthropomorphism） 一种模仿人体形式或具有人类属性的观念或现象。

后殿（apse） 半圆形或多边形，凸出于建筑物，通常是拱顶，特别用于庇护所或教堂的东端。

藤架（arbor） 由灌木和树枝构成的庇荫处，或者缠着爬藤和花朵的格架下面的阴凉处。

拱廊（arcade） 支撑在柱子或柱墩上的一系列的拱券；也指拱形的、带顶的长廊或通道，一边或两边都有商店。

拱券（arch） 跨越空间的曲线结构，设计目的主要是通过轴向压力来支撑垂直荷载。

楣梁（architrave） 古典柱顶盘上最低的部分，直接坐落于柱头之上，支撑着中楣。

中庭（atrium） 起初是古罗马住宅中的主厅或内部中厅，中央对天开敞，通常有水池来收集雨水。后来指早期基督教教堂中的前院，侧面是柱廊或者四面柱廊围绕。现在指开敞的、天窗采光的庭院，围绕庭院施建住宅或建筑物。

轴线（axis） 把一个两度的物体或形象一分为二的中心线，或者一个三度的物体或形象关于此线对称；也指一个构图中的要素为了测量尺寸或为了对称而参照的一条直线。

背景（background） 一幅图像的局部被描绘为离前面距离最远的部分。

平衡（balance） 对比的要素、相反的要素或相互作用的要素之间均等的状态；也指一项设计或一幅构图中，局部或部分要素所呈现出的令人愉快的、和谐的排列或比例。

阳台（balcony） 凸出于建筑物墙面的高架平台，有扶手或栏杆环绕。

神龛（baldachin） 由石头或大理石制成的华盖，永远布置在教堂高高的圣坛之上。

基础（base） 墙、柱、柱墩或其他结构的最低部分，通常进行独特的处理，并被认为是一个建筑单元。

巴西利卡（basilica） 一种大型的长方形建筑物，在古罗马时用作审判大厅和公共集会场所，一般具有一个高高的中央空间，这里由天窗采光，被木构架覆盖，半圆形后殿中有供审判员就座的高台。罗马的巴西利卡成为早期基督教巴西利卡的原型，基督教巴西利卡的特点是一个长长的矩形平面，高高的带有柱廊的中殿，以天窗采光，并覆盖着木质山墙屋顶，有两条或四条低矮的侧廊，端部有半圆形的后殿，还有一个前厅以及其他一些特征，如中庭、圣殿以及走廊终点处的小型半圆后殿。

开间（bay） 一种主要的空间分区，通常是一系列中的一个，以结构体系中主要的垂直支撑构件来指示或划分；也指许多主要隔间或墙体分隔、屋顶分隔中的任意部分，或者一栋建筑物中用垂直或横向支撑分隔的其他部分。

梁（beam） 刚性结构构件，其设计目的是承受横向荷载，并把荷载从空间中传到支撑要素上。

承重墙（bearing wall） 能够承受荷载的墙体，比如建筑物的楼板或屋顶施加的荷载。

观景楼（belvedere） 一栋建筑或一栋富有特色的建筑物，其设计目的和坐落位置都是为了观望令人愉快的景色。

圣殿（bema） 在早期的基督教教堂中，把中殿和半圆形后殿分开的横向的开敞空间，后来发展成十字形教堂的耳堂。

护堤（berm）紧靠建筑物的一面或多面外墙的土堤，作为抵御极端温度的保护设施。

灌木（bosket） 花园或公园中的小树林或树丛。

窗板（brise-soleil） 一层屏风，通常是百叶，位于建筑物的外面，使窗户免受直射光的照射。

钟楼（campanile） 钟塔通常靠近教堂的主体，但不与教堂相连。

悬臂（cantilever） 梁或其他刚性构件伸到支点以外，由一个平衡构件支撑或支点后面一个向下的力支撑。

柱头（capital） 柱子、支柱或柱墩上端独特的处理，为柱身加冕，并承载柱顶盘或楣梁的重量。

客栈（caravansary） 在近东地区为旅行商队提供夜宿的旅馆，一般有一个大院子，院子四周是实墙，从一个宏伟的入口进入。

女像柱（caryatid） 作为柱子用的女性塑像。

大教堂（cathedral） 主教管辖区内的大教堂，设有主教座位，称为“主教宝座（cathedra）”。

顶棚（ceiling） 一个房间的室内顶面或顶上涂层，通常覆盖了楼板或上面屋顶的下表面。

衣冠冢（cenotaph） 用来悼念逝者的纪念碑，但逝者的遗体埋在其他地方。

佛堂（chaitya） 印度的佛教寺庙，通常是在山腰坚硬的岩石上开凿出来的，形式为狭长的巴西利卡式，一端有佛塔。

chancel The space about the altar of a church for the clergy and choir, often elevated above the nave and separated from it by a railing or screen.

chapel A subordinate or private place of worship or prayer.

church A building for public Christian worship.

charterhouse A Carthusian monastery.

clerestory A portion of an interior rising above adjacent rooftops and having windows admitting daylight to the interior.

cloister A covered walk having an arcade or colonnade on one side opening onto a courtyard.

colonnade A series of regularly spaced columns supporting an entablature and usually one side of a roof structure.

column A rigid, relatively slender structural member designed primarily to support compressive loads applied at the member ends. In classical architecture, a cylindrical support consisting of a capital, shaft, and usually a base, either monolithic or built up of drums the full diameter of the shaft.

contrast Opposition or juxtaposition of dissimilar elements in a work of art to intensify each element's properties and produce a more dynamic expressiveness.

corbel To set bricks or stones in an overlapping arrangement so that each course steps upward and outward from the vertical face of a wall.

cornice The uppermost member of a classical entablature, consisting typically of a cymatium, corona, and bed molding.

corona The projecting, slablike member of a classical cornice, supported by the bed molding and crowned by the cymatium.

corridor A narrow passageway or gallery connecting parts of a building, esp. one into which several rooms or apartments open.

cortile A large or principal courtyard of an Italian palazzo.

court An area open to the sky and mostly or entirely surrounded by walls or buildings.

courtyard A court adjacent to or within a building, esp. one enclosed on all four sides.

cyma recta A projecting molding having the profile of a double curve with the concave part projecting beyond the convex part.

cymatium The crowning member of a classical cornice, usually a cyma recta.

dado The major part of a pedestal between the base and the cornice or cap. Also, the lower portion of an interior wall when faced or treated differently from the upper section, as with paneling or wallpaper.

datum Any level surface, line, or point used as a reference for the positioning or arrangement of elements in a composition.

emphasis Stress or prominence given to an element of a composition by means of contrast, anomaly, or counterpoint.

entablature The horizontal section of a classical order that rests on the columns, usually composed of a cornice, frieze, and architrave.

ergonomics An applied science concerned with the characteristics of people that need to be considered in the design of devices and systems in order that people and things will interact effectively and safely.

facade The front of a building or any of its sides facing a public way or space, esp. one distinguished by its architectural treatment.

field A region or expanse of space characterized by a particular property, feature, or activity.

figure A shape or form, as determined by outlines or exterior surfaces. Also, a combination of geometric elements disposed in a particular form or shape.

figure–ground A property of perception in which there is a tendency to see parts of a visual field as solid, well-defined objects standing out against a less distinct background.

floor The level base surface of a room or hall upon which one stands or walks. Also, a continuous supporting surface extending horizontally throughout a building, having a number of rooms and constituting one level in the structure.

form The shape and structure of something as distinguished from its substance or material. Also, the manner of arranging and coordinating the elements and parts of a composition so as to produce a coherent image; the formal structure of a work of art.

fresco The art or technique of painting on a freshly spread moist plaster surface with pigments ground up in water or a lime water mixture.

frieze The horizontal part of a classical entablature between the cornice and architrave, often decorated with sculpture in low relief. Also, a decorative band, as one along the top of an interior wall, immediately below the cornice, or a sculptured one in a stringcourse on an outside wall.

galleria A spacious promenade, court, or indoor mall, usually having a vaulted roof and lined with commercial establishments.

gallery A long, relatively narrow room or hall, esp. one for public use and having architectural importance through its scale or decorative treatment. Also, a roofed promenade, esp. one extending inside or outside along the exterior wall of a building.

gestalt A unified configuration, pattern, or field of specific properties that cannot be derived from the summation of the component parts.

Gestalt psychology The theory or doctrine that physiological or psychological phenomena do not occur through the summation of individual elements, as reflexes or sensations, but through gestalts functioning separately or interrelatedly.

Golden Section A proportion between the two dimensions of a plane figure or the two divisions of a line, in which the ratio of the smaller to the larger is the same as the ratio of the larger to the whole: a ratio of approximately 0.618 to 1.000.

ground The main surface or background in painting or decorative work. Also, the receding part of a visual field against which a figure is perceived.

hall The large entrance room of a house or building, as a vestibule or lobby. Also, a large room or building for public gatherings or entertainment.

harmony The orderly, pleasing, or congruent arrangement of the elements or parts in an artistic whole.

高坛（chancel） 教堂圣坛周围供牧师和唱诗班使用的空间，通常高于中殿部分，并用栏杆或屏风隔开。

礼拜堂（chapel） 用于祈祷或做礼拜的附属场所或私人场所。

教堂（church） 供基督徒做礼拜的公共建筑物。

卡尔特修道院（charterhouse） 卡尔特教派的修道院。

天窗（clerestory） 室内的一部分，高于相邻的屋顶，有窗户，让日光进入室内。

回廊（cloister） 有顶的步道，一侧有拱廊或柱廊，朝向庭院开敞。

柱廊（colonnade） 一系列间距规整的柱子支撑着柱顶盘，通常还支撑一侧的屋顶结构。

柱子（column） 一种刚性的、相对比较纤细的结构构件，主要用来承载构件顶端的压力。在古典建筑中，圆柱形支撑体包括柱头、柱身，通常还有柱基。柱基是一块巨石，或者是做成鼓状，相当于柱身的整个直径。

对比（contrast） 在一件艺术作品中，将不同的要素相对或并置，目的是强化每个要素的特征，同时产生一种更富于动态的表情。

托梁（corbel） 在搭接式砌体上砌筑砖或石，这样一来，每一步骤都会从垂直墙面向上、向外伸出一个台阶。

檐口（cornice） 古典檐部的最高部分，一般包括波纹线脚、顶檐和檐板下缘线。

顶檐（corona） 古典檐口上凸出的板状构件，由线脚支撑，顶部是波纹线脚。

走廊（corridor） 狭窄的通道或长廊，将建筑物的各个部分连接在一起，特别是那种几个房间或公寓向其开门的廊道。

意大利庭院（cortile） 意大利府邸内部的大型庭院或主要庭院。

院子（court） 完全露天的区域，大部分或完全被墙或建筑物围绕。

庭院（courtyard） 临近建筑物或在建筑物内部的院子，特别是那种四面都被围合的院子。

正波纹线（cyma recta） 一种凸出的造型，外轮廓为双曲线，其凹进的部分突出于凸起部分之外。

波纹线脚（cymatium） 古典檐口的顶部构件，通常是正波纹线。

护墙板（dado） 在基底、檐口或柱头之间的基座的主要部分，也指对内墙下半部分所做的不同于上部的处理或饰面，比如在墙体下部的贴板或墙纸的处理。

基准（datum） 任何水平的面、线或点，用来作为定位或排列构图要素的参考。

强调（emphasis） 通过对比、变异或对位，使构图中的一个要素加强或突出。

柱顶盘（entablature） 古典柱式的水平部分，位于柱顶之上，通常包括挑檐、饰带和柱顶过梁。

人体工程学（ergonomics） 与人类特点相关的应用科学，倡导设计方法和设计体系应该考虑人的需要，目的是使人与物之间更有效、更安全地相互作用。

正面（facade） 建筑物的前面或朝向公共道路及公共空间的各个侧面，特别是建筑处理与众不同的那面。

领域（field） 空间区域或广阔的空间地带，其特点是具有特殊的属性、面貌或行为。

图形（figure） 某种形状或形式，可以由外轮廓线或外表面决定；也指多种几何要素综合构成特殊的形式或形状。

图—底（figure-ground） 知觉的一种特性、一种倾向，即把视野中的局部看作实体、看作界限明确的物体，从特点并不明确的背景中突显出来并与之形成对比。

楼板（floor） 一个房间或大厅的楼层基面，人在上面站立或行走；也指一个连续的支撑面水平扩展贯穿整个建筑物，有很多房间并且构成一个结构层。

形式（form） 某物的形状和结构不同于其组成物质或材料；也指布置与调整构图要素与局部的方式，目的是产生一个连贯的形象，即一件艺术作品的外形结构。

湿壁画法（fresco） 一种艺术或绘画技巧，在新鲜宽阔的湿石灰表面，将颜料碾碎溶解于水或石灰水混合物。

中楣（frieze） 古典檐壁上的水平部分，在檐口和框缘之间，常常以浅浮雕装饰；也指一条装饰带，比如沿着室内墙面顶部、刚好在檐口下面的装饰带，或指外墙上带有雕塑的束带。

风雨商业廊（galleria） 宽阔的步道、院子或室内商业街，通常具有拱顶且商业设施成行排列。

游廊（gallery） 长长的、相对较窄的空间或厅，特指为公众使用的，以及通过尺度或装饰处理而在建筑中具有重要作用的长廊；也指带顶的步道，特别是在室内或室外沿着建筑物的外墙延伸的步道。

完形（gestalt） 具有特殊属性的统一的结构、图案或领域，它并不是来自组成部分的相加。

格式塔心理学（Gestalt psychology） 一种理论或学说，即生理或心理的现象并不是通过单独要素的简单相加而发生的，如反应或感觉，而是通过完形作用分离或互相联系的。

黄金分割（Golden Section） 一个平面图形的两部分之间或一条线的两段之间的比例，其中小者与大者的比值等于大者与全体的比值，比值大约是0.618 : 1.000。

底色（ground） 绘画或装饰作品中的主要面或背景；同时也指视野中退后的部分，与此形成对比的某个形象则被清楚地看到。

门厅（hall） 一座住宅或一座建筑物入口处的大型空间，比如门廊或休息厅，也指用于公众聚会或娱乐的大型房间或建筑物。

协调（harmony） 在一个艺术整体中，秩序化的、令人愉快的或得体的要素安排或局部安排。

hierarchy A system of elements ranked, classified, and organized one above another, according to importance or significance.

in antis Between antae, the rectangular piers or pilasters formed by thickening the end of a projecting wall.

intercolumniation A system for spacing columns in a colonnade based on the space between two adjacent columns measured in diameters.

joist Any of a series of small, parallel beams for supporting floors, ceilings, or flat roofs.

lintel A beam supporting the weight above a door or window opening.

mass The physical volume or bulk of a solid body.

massing A unified composition of two-dimensional shapes or three-dimensional volumes, esp. one that has or gives the impression of weight, density, and bulk.

mausoleum A large and stately tomb.

megalith A very large stone used as found or roughly dressed, esp. in ancient construction work.

megaron A building or semi-independent unit of a building, typically having a rectangular principal chamber with a center hearth and a porch, often of columns in antis: traditional in Greece since Mycenaean times and believed to be the ancestor of the Doric temple.

menhir A prehistoric monument consisting of an upright megalith, usually standing alone but sometimes aligned with others.

mezzanine A low or partial story between two main stories of a building, esp. one that projects as a balcony and forms a composition with the story beneath it.

minaret A lofty, slender tower attached to a mosque, having stairs leading up to one or more projecting balconies from which the muezzin calls the Muslim people to prayer.

model An example serving as a pattern for imitation or emulation in the creation of something.

module A unit of measurement used for standardizing the dimensions of building materials or regulating the proportions of an architectural composition.

monastery A place of residence for a community of persons living in seclusion under religious vows, esp. monks.

monolith A single block of stone of considerable size, often in the form of an obelisk or column.

mosque A Muslim building or place of public worship.

mullion A vertical member between the lights of a window or the panels in wainscoting.

mural A large picture painted on or applied directly to a wall or ceiling surface.

narthex The portico before the nave of an early Christian or Byzantine church, appropriated to penitents. Also, an entrance hall or vestibule leading to the nave of a church.

nave The principal or central part of a church, extending from the narthex to the choir or chancel and usually flanked by aisles.

obelisk A tall, four-sided shaft of stone that tapers as it rises to a pyramidal point, originating in ancient Egypt as a sacred symbol of the sun-god Ra and usually standing in pairs astride temple entrances.

order A condition of logical, harmonious, or comprehensible arrangement in which each element of a group is properly disposed with reference to other elements and to its purpose. Also, an arrangement of columns supporting an entablature, each column comprising a capital, shaft, and usually a base.

orthographic Pertaining to, involving, or composed of right angles.

pagoda A Buddhist temple in the form of a square or polygonal tower with roofs projecting from each of its many stories, erected as a memorial or to hold relics. From the stupa, the Indian prototype, the pagoda gradually changed in form to resemble the traditional multi-storied watch tower as it spread with Buddhism to China and Japan.

palazzo A large, imposing public building or private residence, esp. in Italy.

pantheon A temple dedicated to all the gods of a people. Also, a public building serving as the burial place of or containing the memorials to the famous dead of a nation.

parterre An ornamental arrangement of flower beds of different shapes and sizes.

parti The basic scheme or concept for an architectural design, represented by a diagram.

pavilion A light, usually open building used for shelter, concerts, or exhibits, as in a park or fair. Also, a central or flanking projecting subdivision of a facade, usually accented by more elaborate decoration or greater height and distinction of skyline.

pedestal A construction upon which a column, statue, memorial shaft, or the like, is elevated, usually consisting of a base, a dado, and a cornice or cap.

pergola A structure of parallel colonnades supporting an open roof of beams and crossing rafters or trelliswork, over which climbing plants are trained to grow.

piazza An open square or public place in a city or town, esp. in Italy.

pier A vertical supporting structure, as a section of wall between two openings or one supporting the end of an arch or lintel.

pilaster A shallow rectangular feature projecting from a wall, having a capital and a base and architecturally treated as a column.

pilastrade A row of pilasters.

pillar An upright relatively slender shaft or structure, usually of brick or stone, used as a building support or standing alone as a monument.

Platonic solid One of the five regular polyhedrons: tetrahedron, hexahedron, octahedron, dodecahedron, or icosahedron.

plaza A public square or open space in a city or town.

podium A solid mass of masonry visible above ground level and serving as the foundation of a building, esp. the platform forming the floor and substructure of a classical temple.

等级（hierarchy） 要素接连不断地排列、分类和组合的系统，其根据是要素的重要性和象征意义。

壁柱（in antis） 在壁角柱子之间的长方形墙墩或壁柱，由凸出的墙体尽端的加厚部分形成。

分柱法（intercolumniation） 在柱廊中划分柱子间距的系统，以两根相邻柱子之间的空间为依据，以柱子的直径为度量单位。

托梁（joist） 用来支撑楼板、顶棚或平屋顶的一系列小尺寸的平行梁。

过梁（lintel） 支撑着门窗开洞上面重量的梁。

体量（mass） 一个固态物体的实际容积或体积。

厚重实体（massing） 两度形状或三度体积的整体构图，特别是那种具有重量、密度和体积的东西或给人这种感觉的东西。

陵墓（mausoleum） 大型而庄严的墓葬。

巨石（megalith） 非常巨大的石头，可直接利用或简单地加工一下，特别用于古代的建造工程。

中央大厅（megaron） 一栋建筑物或一栋建筑物中的半独立单元，一般来讲有一个长方形主室和前厅，主室中央是壁炉，四角有柱，从迈锡尼时代的古希腊就已有之，被认为是多立克神庙的原型。

史前纪念碑（menhir） 史前的纪念碑，由竖直向上的巨石组成，一般情况下独立，但有时也与其他巨石一起排列成行。

夹层（mezzanine） 建筑物两个主要楼层之间的低矮或局部的楼层，特别指凸出在外作为平台，并与下面的楼层形成整体构图的地方。

尖塔（minaret） 高耸而纤细的塔，附属于清真寺，有台阶通向一个或多个凸出的平台，在这些平台上报时者召集穆斯林民众前来祈祷。

模型（model） 在创作某物时，作为模仿或效法模式的实例。

模度（module） 一种测量单位，用来使建筑材料的尺度标准化或控制建筑构图的比例。

修道院（monastery） 隐居人群居住的场所，他们受宗教誓约的约束，通常指僧侣居住的地方。

独石碑（monolith） 一块独立的、尺寸相当大的巨石，通常以石碑或石柱的形式出现。

清真寺（mosque） 穆斯林建筑或公众朝拜的场所。

竖框（mullion） 窗户中间的竖向构件或护墙板上的面板。

壁画（mural） 大型绘画，直接画在墙上或顶棚表面，或者把画直接用于墙面或顶棚表面。

教堂前厅（narthex） 早期天主教或拜占庭教堂中，到达中殿前的门廊，适用于忏悔者；也指入口大厅或通向教堂中殿的门厅。

中殿（nave） 教堂的主要部分或中央部分，从教堂的前厅延伸到唱诗班的席位或圣坛的高坛，侧面通常是耳堂。

方尖碑（obelisk） 一种高高的四面体的石碑，随着碑身向金字塔式顶点逐渐升高，碑身逐渐变细，起源于古埃及，作为太阳神的神圣象征，常常成对布置在寺庙入口的两侧。

秩序（order） 逻辑化、和谐或易于理解的排列状态，在这种状态下，一组中的每个要素都考虑了其他要素和本身的目的而得到合理的处置。同时还指许多柱子支撑着柱顶盘的排列方式，每根柱子都包括柱头、柱身，通常还有一个柱础。

垂直线（orthographic） 属于直角、包括直角或由直角构成。

佛塔（pagoda） 佛教圣堂，形式为方形或多边形塔，由多层构成，每层屋顶向外挑出，作为纪念碑或为了存放遗物而建立。从原型印度佛塔开始，随着佛教在中国和日本的传播，佛塔的形式逐渐转变成类似于传统的多层瞭望塔的形式。

府邸（palazzo） 富丽堂皇的大型公共建筑或私人住宅，特别在意大利。

万神庙（pantheon） 献给人类诸神的一座庙宇，同时也是一座公共建筑，作为已逝国家名人的纪念场所，或收藏着他们的纪念物。

花圃（parterre） 不同形状、不同尺寸的花床呈装饰化的布局。

建筑图解（parti） 一项建筑设计的基本计划或概念，以图表的形式出现。

阁（pavilion） 一种轻型建筑物，通常是开敞的，比如在公园或交易市场中用来遮风避雨、听音乐会或看展览的建筑；也指正立面的中间部分或侧面凸出的部分，通常用更精致的装饰或非常的高度和独特的天际线来加以强调。

基座（pedestal） 柱子、塑像、纪念柱等诸如此类的东西可以建于其上的构筑物，通常包括底部、台座、檐口和柱头。

藤架（pergola） 平行的柱廊结构，支撑着梁和交叉椽或格子组成的开敞屋顶，上面长满攀缘植物。

意大利广场（piazza） 城镇中的开敞区域或公共场所，这个词特别用于意大利。

支撑墩（pier） 竖向支撑结构，墙面上两洞口之间的部分，或者作为拱券或过梁尽端的支撑。

壁柱（pilaster） 样式为凸出于墙面的浅长方形，有柱头和柱础，在建筑上把它视为柱子。

壁柱列（pilastrade） 一排壁柱。

细柱（pillar） 竖直向上且相对比较纤细的支柱或结构物，通常用砖或石头制成，用作建筑物的支撑或作为纪念碑而独立。

柏拉图实体（Platonic solid） 五个规则的多面体之一：四面体、六面体、八面体、十二面体、二十面体。

广场（plaza） 城镇中的公共场地或开放空间。

墩座（podium） 砌筑的实体，在地面标高之上可以看到，同时作为建筑物的基础，特别是在一座古典庙宇中，形成地面和基础的平台。

porch An exterior appendage to a building, forming a covered approach or vestibule to a doorway.

porte-cochère A porch roof projecting over a driveway at the entrance to a building and sheltering those getting in or out of vehicles. Also, a vehicular passageway leading through a building or screen wall into an interior courtyard.

portico A porch or walkway having a roof supported by columns, often leading to the entrance of a building.

post A stiff vertical support, esp. a wooden column in timber framing.

postern A private or side entrance, as one for pedestrians next to a porte-cochère.

promenade An area used for a stroll or walk, esp. in a public place, as for pleasure or display.

proportion The comparative, proper, or harmonious relation of one part to another or to the whole with respect to magnitude, quantity, or degree. Also, the equality between two ratios in which the first of the four terms divided by the second equals the third divided by the fourth.

prototype An early and typical example that exhibits the essential features of a class or group and on which later stages are based or judged.

proxemics The study of the symbolic and communicative role of the spatial separation individuals maintain in various social and interpersonal situations, and how the nature and degree of this spatial arrangement relates to environmental and cultural factors.

pylon A monumental gateway to an ancient Egyptian temple, consisting either of a pair of tall truncated pyramids and a doorway between them or of one such masonry mass pierced with a doorway, often decorated with painted reliefs.

pyramid A masonry mass having a rectangular base and four stepped and sloping faces culminating in a single apex, used in ancient Egypt and pre-Columbian Central America as a tomb or a platform for a temple.

quoin An external solid angle of a wall, or one of the stones forming such an angle, usually differentiated from the adjoining surfaces by material, texture, color, size, or projection.

rampart A broad embankment of earth raised as a fortification around a place and usually surmounted by a parapet.

ratio Relation in magnitude, quantity, or degree between two or more similar things.

reentrant Reentering or pointing inward, as an interior angle of a polygon that is greater than 180°.

regular Having all faces congruent regular polygons and all solid angles congruent.

repetition The act or process of repeating formal elements or motifs in a design.

rhythm Movement characterized by a patterned repetition or alternation of formal elements or motifs in the same or a modified form.

roof The external upper covering of a building, including the frame for supporting the roofing.

room A portion of space within a building, separated by walls or partitions from other similar spaces.

scale A proportion determining the relationship of a representation to that which it represents. Also, a certain proportionate size, extent, or degree, usually judged in relation to some standard or point of reference.

semiotics The study of signs and symbols as elements of communicative behavior.

shrine A building or other shelter, often of a stately or sumptuous character, enclosing the remains or relics of a saint or other holy person and forming an object of religious veneration and pilgrimage.

sill The lowest horizontal member of a frame structure, resting on and anchored to a foundation wall. Also, the horizontal member beneath a door or window opening.

solarium A glass-enclosed porch, room, or gallery used for sunbathing or for therapeutic exposure to sunlight.

solid A geometric figure having the three dimensions of length, breadth, and thickness.

space The three-dimensional field in which objects and events occur and have relative position and direction, esp. a portion of that field set apart in a given instance or for a particular purpose.

stair One of a flight or series of steps for going from one level to another, as in a building.

stele An upright stone slab or pillar with a carved or inscribed surface, used as a monument or marker, or as a commemorative tablet in the face of a building.

stoa An ancient Greek portico, usually detached and of considerable length, used as a promenade or meeting place around public places.

stringcourse A horizontal course of brick or stone flush with or projecting beyond the face of a building, often molded to mark a division in the wall.

symbol Something that represents something else by association, resemblance, or convention, esp. a material object used to represent something invisible or immaterial, deriving its meaning chiefly from the structure in which it appears.

symbology The study of use of symbols.

symmetry The exact correspondence in size, form, and arrangement of parts on opposite sides of a dividing line or plane, or about a center or axis. Also, regularity of form or arrangement in terms of like, reciprocal, or corresponding parts.

synagogue A building or place of assembly for Jewish worship and religious instruction.

technology Applied science: the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science.

门廊（porch） 建筑物的室外附属部分，形成通向入口的带顶通道或前厅。

车辆门廊或通道（porte-cochère） 在通向建筑物的入口处，顶棚凸出覆盖了车行道的门廊，同时带顶的门廊遮住了进出的车辆。还有一层意思是穿过建筑物或幕墙，进入内院的车辆过道。

柱廊（portico） 带有屋顶的门廊或人行道，屋顶由柱子支撑，通常导向建筑物的入口。

支柱（post） 坚硬的垂直支持物，特别是木制框架中的木柱。

后门（postern） 私密入口或侧入口，比如一个行人入口，旁边是一个车辆入口。

散步场所（promenade） 为娱乐或展示目的而开辟的用于漫步或行走的区域，特别是在一个公共场所。

比例（proportion） 一部分与另一部分之间或部分与整体之间接近的、恰当的或和谐的关系，与大小、数量和等级有关。还有，两个相等的比值，即四项之中的第一项除以第二项等于第三项除以第四项。

原型（prototype） 展现了某一种类或某一组群本质特征的早期典型实例，它是后期阶段的基础和判断依据。

空间关系学（proxemics） 研究那些存在于各种各样的社会与人际关系中的空间分割体的象征与表意作用，并研究这种空间布置与环境和文化因素相关的程度和特点。

塔门（pylon） 通向古埃及庙宇的纪念性入口，或者由一对平头金字塔及塔间的门道组成，或者是仅有一个这样的砖石砌体，砌体从中打通，门道上面通常装饰着彩色的浮雕。

金字塔（pyramid） 砖石砌体，具有矩形基座和四个台阶状的坡面，顶部交于一点，用于古埃及和哥伦布发现美洲大陆以前的中美洲，作为陵墓或庙宇的平台。

隅石（quoin） 外部的石墙角或用来建这种角的石头，一般来讲，其材料、质感、色彩、尺寸或凸出程度不同于附近的表面。

城墙（rampart） 作为环绕某一场所的防御工事而建的宽阔的土堤，通常在顶上有栏杆。

比值（ratio） 两个或多个相似的物体之间在大小、数量和级别上的关系。

凹角（reentrant） 凹入或指向内部，比如一个多边形的内角大于180度的情形。

全等体（regular） 所有面都是全等的正多边形和全等的立体角。

重复（repetition） 在一项设计中，反复出现形式要素或主题的行为或过程。

韵律（rhythm） 是指某种运动，其特点是形式要素或主题图案化地重复或交替出现在同一个形式或一个变异形式中。

屋顶（roof） 建筑物外部最上面的覆盖部分，包括支撑屋顶材料的框架。

房间（room） 建筑物中的一部分空间，用墙或隔断与其他类似的空间分开。

尺度（scale） 规定一个标记与它所代表的实物之间关系的比例；也指某个成比例的尺寸、范围或程度，通常是与某些标准或参照点进行比较后做出的判断。

符号学（semiotics） 研究记号与符号作为表意行为的要素。

神殿（shrine） 一栋建筑或其他的庇护所，常常具有庄严而华丽的特点，里面有圣徒或其他圣人的遗体或遗物，成为宗教崇拜和朝圣的地方。

底框梁（sill） 框架结构中最低的水平构件，坐落并固定在基础墙上。它也是门窗开洞下面的水平构件。

日光室（solarium） 用玻璃围起来的阳台、房间或走廊，用来做日光浴或为了治疗而暴露在阳光下。

实体（solid） 具有长度、宽度和厚度的三度几何形状。

空间（space） 三度的区域，物体或事件出现于其中并具有相对位置和方向，特别是在特定的情况下或出于某种特殊的目的，那个区域的一部分被分离出来。

楼梯（stair） 用于从一个高程到另一个高程的一段或一系列台阶，就像在建筑物中经常出现。

石碑（stele） 竖直向上的石板或柱子，表面有雕刻或碑文，用作纪念碑或里程碑，或者在建筑物的立面上当作纪念匾额。

柱廊（stoa） 古希腊的一种长廊，通常是分离的，相当长，用于公共空间周围的散步或集会场所。

层拱（stringcourse） 砖或石形成的水平带，与建筑立面齐平或凸出建筑立面之外，通常被塑造成墙面上的分界线。

符号（symbol） 某物因为相关、相似或约定俗成，而代表着其他事物，特别是一个实际的物体用来代表某些看不到、没有物质实体的东西，其含义主要来自它所存在的结构。

象征学（symbology） 研究符号的运用。

对称（symmetry） 在一条分界线或一个分界面的两侧，或者围绕一个中心或一条轴，对等地布置尺寸、形式和排列完全相符的部件。再有，形式和排列的规律性要依据部件的相似性、互补性或对应性。

犹太教堂（synagogue） 犹太教礼拜以及宗教活动聚集的建筑或场所。

工艺（technology） 它是一门应用科学，是关于技术方法创造与应用，以及技术方法与生活、社会和环境之间关系的知识分支，吸收了工业艺术、工程学、应用科学以及纯科学等学科的知识。

tectonics The art and science of shaping, ornamenting, or assembling materials in building construction.

tensile structure A thin, flexible surface that carries loads primarily through the development of tensile stresses.

terrace A raised level with a vertical or sloping front or sides faced with masonry, turf, or the like, esp. one of a series of levels rising above one another.

tetrastyle Having four columns on one or each front.

tholos A circular building in classical architecture.

threshold A place or point of entering or beginning.

tokonoma Picture recess: a shallow, slightly raised alcove for the display of a flower arrangement or a kakemono, a vertical hanging scroll containing either text or a painting. One side of the recess borders the outside wall of the room through which light enters, while the interior side adjoins the tana, a recess with built-in shelving. As the spiritual center of a traditional Japanese house, the tokonoma is located in its most formal room.

topography The physical configuration and features of a site, area, or region.

torii A monumental, freestanding gateway on the approach to a Shinto shrine, consisting of two pillars connected at the top by a horizontal crosspiece and a lintel above it, usually curving upward.

transformation The process of changing in form or structure through a series of discrete permutations and manipulations in response to a specific context or set of conditions without a loss of identity or concept.

trellis A frame supporting open latticework, used as a screen or a support for growing vines or plants.

trullo A circular stone shelter of the Apulia region of southern Italy, roofed with conical constructions of corbeled dry masonry, usually whitewashed and painted with figures or symbols. Many trulli are over 1,000 years old and still in use today, usually located among vineyards to serve as storage structures or as temporary living quarters during the harvest.

truss A structural frame based on the geometric rigidity of the triangle and composed of linear members subject only to axial tension or compression.

uniformity The state or quality of being identical, homogeneous, or regular.

unity The state or quality of being combined into one, as the ordering of elements in an artistic work that constitutes a harmonious whole or promotes a singleness of effect.

vault An arched structure of stone, brick, or reinforced concrete, forming a ceiling or roof over a hall, room, or other wholly or partially enclosed space. Since it behaves as an arch extended in a third dimension, the longitudinal supporting walls must be buttressed to counteract the thrusts of the arching action.

veranda A large, open porch, usually roofed and partly enclosed, as by a railing, often extending across the front and sides of a house.

vestibule A small entrance hall between the outer door and the interior of a house or building.

villa A country residence or estate.

void An empty space contained within or bounded by mass.

volume The size or extent of a three-dimensional object or region of space, measured in cubic units.

wainscot A facing of wood paneling, esp. when covering the lower portion of an interior wall.

wall Any of various upright constructions presenting a continuous surface and serving to enclose, divide, or protect an area.

筑造学（tectonics） 在房屋建造过程中塑形、装饰或材料装配的艺术与科学。

张拉结构（tensile structure） 纤细、灵活的表面，主要通过拉应力来承担荷载。

台地（terrace） 高起的平地，正面或各面都是垂直的或斜坡，面对砖石建筑或草坪以及类似的东西，特别指一系列高程逐渐抬高的平地中的一个。

四柱式（tetrastyle） 在某一立面或各个立面有四根柱子。

圆形建筑（tholos） 古典建筑式样的圆形建筑物。

门槛（threshold） 进入或开始的地点。

画室（tokonoma） 藏画的地方：一间浅浅的、稍微抬高的凹室，用来陈列插花或日本字画，即垂直悬挂的卷轴画，上面既有书法又有绘画。凹室的一边沿着居室的外墙，光线从这边照过来，室内一边邻近重要位置，一个带有嵌入式架子的凹壁。作为传统日本住宅的精神中心，画室位于住宅中最为重要的房间里。

地形（topography） 基地、空间或某一区域的实际形态和特征。

牌坊（torii） 是通向神道教庙宇的大门，具有纪念性的、独立的特点，由两根柱子构成，两柱的顶部以水平横梁相连，横梁之上有一根过梁，通常向上弯曲。

转换（transformation） 为了与特定的环境或条件相适应，通过一系列不连续的变换与处理而进行的形式或结构的变化过程，其特点和基本概念在整个过程中并未失去。

格架（trellis） 一副框架支撑着露天的格子，用作屏风或葡萄藤以及其他植物的支架。

特鲁洛（trullo） 意大利南部阿普利亚地区的圆形石砌掩所，屋顶是干燥的石砌体向外层层凸出，形成圆锥状的构造，通常用石灰水刷白。

构架（truss） 以规整的三角形为基础的结构框架，由线式元素构成，只承受轴向的拉力或压力。

一致（uniformity） 具有可识别性、相似性和规律性的状态或特点。

统一（unity） 合而为一的状态或特点，例如给艺术作品中的要素建立秩序，构成一个和谐的整体或形成单一的效果。

拱顶（vault） 由石头、砖或钢筋混凝土制成的拱券结构，在大厅、房间或其他全封闭或半封闭的空间上形成天花或屋顶。由于它作为拱券在第三量度上延伸，纵向的支撑墙必须用支撑物加固，以抵消拱券作用的推力。

露台（veranda） 大型的开放的阳台，通常有顶并部分封闭，有扶手栏杆，常常延伸到房子的正面或侧面。

门廊（vestibule） 外门与住宅室内或外门与建筑室内之间的入口小厅。

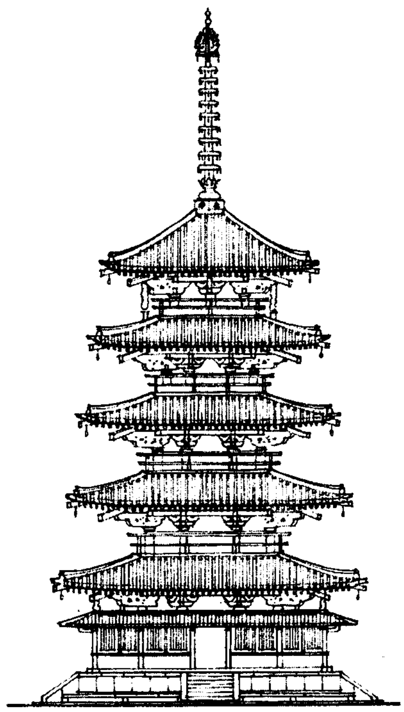
别墅（villa） 一座乡村住宅或房产。

中空（void） 包含在体量内部或被实体围住的空间。

容积（volume） 三度物体或三度空间区域的尺寸或范围，以立方为度量单位。

护墙板（wainscot） 木板饰面，特别是用于覆盖室内墙面的下半部分。

墙壁（wall） 能够提供连续表面并用来围合、划分或保护某一区域的各种垂直的构筑物。



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